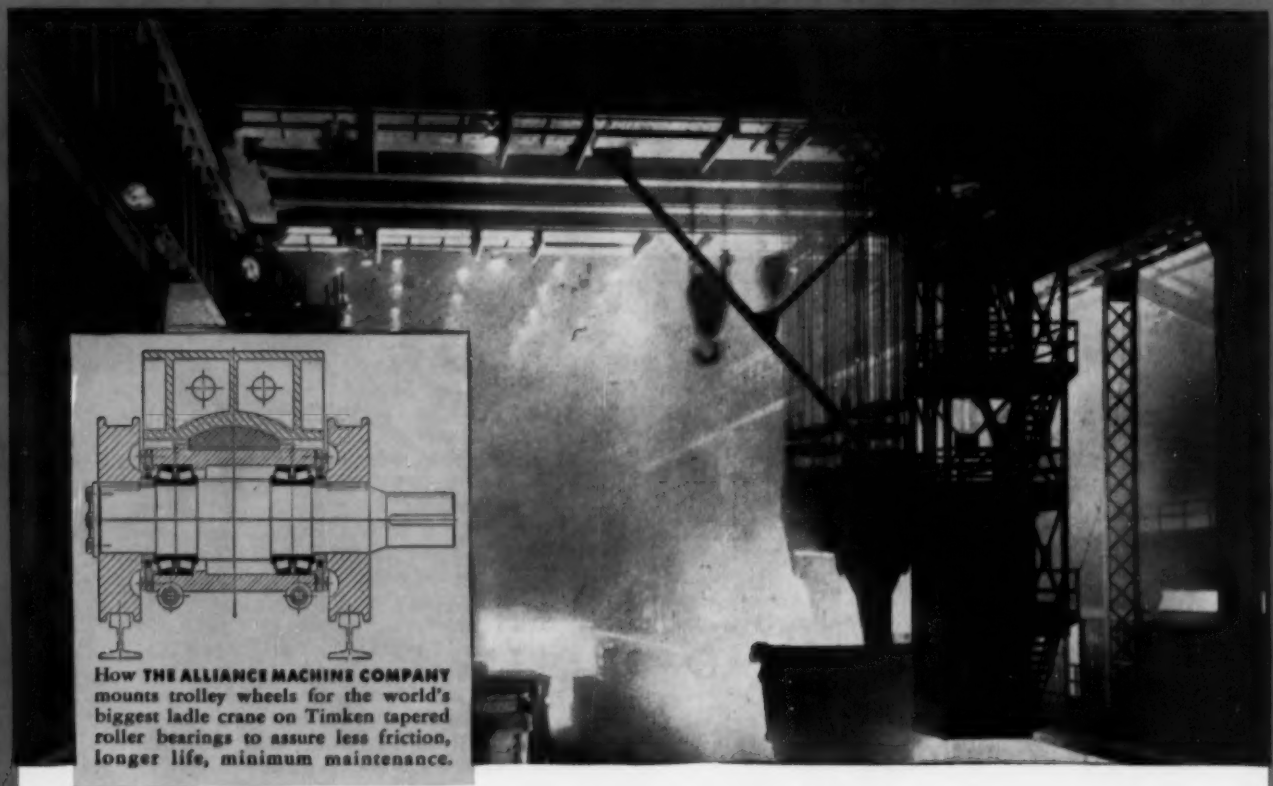
The Iron Age
A Chilton Publication
THE NATIONAL METALWORKING WEEKLY • MARCH 10, 1955

Are the Reds closing the gap in machine tools?
See page 94



How THE ALLIANCE MACHINE COMPANY mounts trolley wheels for the world's biggest ladle crane on Timken tapered roller bearings to assure less friction, longer life, minimum maintenance.

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BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION

BIG ONES

From Forge Shop and Foundry

Some of the biggest forgings and castings made in the world come out of the Bethlehem shops, and many of them are impressive things to see. For example, that massive steel column on the freight car. It is just one inch shy of 70 ft long and weighs 155 tons. For an idea of the size, look at the man standing alongside the railway car. It would take twelve of him, laid end to end, to match the length of the forging.

The big cast sheave wheel isn't exactly a peewee, either. Even though it weighs "only" 30 tons, it's still a mighty big casting. Some intricate work in that piece, and it's typical of the many huge and complex shapes that Bethlehem makes each year.

Down at the other end of the scale, sizewise, are the products of Bethlehem's drop forge shops. Some are so small they can easily be held in the palm of your hand, or balanced on a fingertip. Others take muscle to lift; the 69-pounder shown on this page is a fairly hefty specimen.

Your own needs may fall between the extremes of large and small. But whatever your requirements in forgings or castings, by all means check with Bethlehem. We are equipped to do the job you want . . . whether the pieces are heavy tonnage, or in the medium or lightweight brackets.

Compared to the big press forgings and heavy castings, drop-forged pieces are flyweights. But they're an important item at Bethlehem shops, which have turned out millions of them.

BETHLEHEM STEEL COMPANY
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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM FORGINGS and CASTINGS

the Iron Age

Vol. 175, No. 10, March 10, 1955

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NEWS DEVELOPMENTS

FOUNDRIES REPORT IMPROVING BUSINESS — P. 51
Reflecting general business upturn, foundries are pouring castings at rates well above 1954. Upswing began last fall, continued as steel, automotive, appliance and others increased own production rates. Hotly competitive, foundries themselves are investing in new equipment and methods.

AUTOMAKERS TIP GAW BARGAINING HAND — P. 54
The auto industry is already paying millions in unemployment, pensions, other benefits. It won't back down on automation. Five year pacts are now in their dying days. The UAW has indicated it won't go for extended pacts in the future despite long term benefits and long labor peace. Industry has done good job of selling need for automation.

SEE NO BREAK IN TIGHT NICKEL MARKET — P. 56
Nickel supply remains close but the government is not seen planning controls at this time. Government officials are worried, however, that the tight supply is limiting expansion of nickel consuming industries. They fear a serious fall-off when defense buying slows. Estimate consumption, supply for '55.

PUERTO RICO GOES AFTER NEW INDUSTRIES — P. 60
Commonwealth's 1954 Industrial Incentive Act offers U. S. businessmen 10-year local tax break. Goal of new program is 80,000 industrial jobs by 1960. Special incentives provided for metalworking and other "core" industries. Experts here review good and bad features of a specific production program. Good labor supply is an attraction.

ECONOMY'S REVIVAL SURPRISES EXPERTS — P. 65
Strength of the economic pickup has startled even the most optimistic forecasters. Steel and automotive have captured the headlines, but other industries have also been setting a much faster pace than was anticipated. Slowdown in the auto industry, which must come, won't signal an economic slump. Watch for steel inventory buying to pick up the slack. Employment improvement not keeping pace with general pickup.

TUBELESS TIRES READY FOR TRUCKS — P. 68
Goodyear is first to offer tubeless variety for all sizes of trucks. Assets are light weight and fewer time consuming changes. Sealing qualities lessen blowout danger.

IN METALWORKING

ENGINEERING & PRODUCTION

PLAN CAREFULLY TO GET QUALITY GEARS—P. 91
To produce top quality precision gears takes careful planning, meticulous attention to manufacturing details. First step is to get gear material to close specifications. Forgings must have uniform density, stemming from correct grain size and analysis. Forging at controlled temperatures is important to quality.

SOVIET MACHINE TOOLS USE MORE CARBIDES—P. 94
Metalworking production in Soviet Russia has more than doubled since 1940. Weight, motor capacity and rigidity of new machine tools has been increased considerably. More recently, high-speed machining, using carbide tooling, has become more widespread.

COLD EXTRUSIONS GET FAST ANNEALS HERE—P. 96
Radiant burner furnaces and annealing cycles measured in seconds are part of a fast automated setup for extruding hot-rolled 1010 slugs into rocket heads. Proof is offered that the quick annealing cycles are equal to conventional long soaking for restoring steel ductility after severe cold working. Annealing furnaces and conveyors are flexible enough to anneal only certain workpiece areas, can easily be adapted to handle other products at some future date.

NICKEL PROPERTIES EXTEND PLATING USES — P. 100
Whatever the need for an engineering finish, nickel plating can usually produce the desired properties. Nine basic electrolytic baths, plus many modifications, allow a wide selection in obtaining the required wear or corrosion resistance. Electroless nickel process extends the applications still further.

TECHNIQUE SOLVES SHRINK FITTING PUZZLE—P. 104
Inserting a 1¼ in. diam high-speed steel pin into a Type 410 stainless steel ring with holes larger than pin-size was a problem. There were other complications as well. The technique finally developed produced shrink fitting results consistent to 0.002 in.

MARKETS & PRICES

HIGH STRENGTH WIRE ROPE HITS MARKET — P. 55
New wire rope lines recently introduced by two producers offer increased strength with added staying power. Producers are concentrating right now on mining, logging and similar heavy-duty applications. Wide acceptance seems indicated by favorable initial response.

ELECTRONICS LOOKS FOR RECORD YEAR — P. 58
Radio and TV are only a small part as industry and government uses grow. Color TV is not reaching sales expectations, but this is only dim spot. Research is now far ahead of applications. Sales may reach $10 million.

UPPED STEEL OUTPUT CAUSES SCRAP WORRY—P. 147
Mounting demand and higher ingot rate has steel producers worrying about scrap. That's reason behind recent moves to reduce foreign take of prime scrap grades. Steel orders and backlogs are rising on a broad front. Seasonal factors becoming more important. March may establish an all-time production record for industry. Consumer competition for position on mill schedules is becoming more intense.

STEEL BUILDUP PUTS PRESSURE ON MILLS — P. 148
Broadening base of steel market is aggravating buyer competition for position on mill schedules. Tight first-half demand for some products has stepped up third quarter planning. Full impact of construction, farm, and linepipe ordering still to come. Pressure from other industries shows no sign of easing.

GOVERNMENT CHECKING ALUMINUM SUPPLY — P. 154
Whether or not there really is an aluminum shortage is a question the government is now looking into. Difference of opinion on this matter, plus the growing number of complaints received from fabricators, is reason for the special investigation. Aluminum Extruders Council asks for reduction in stockpile buying, buildup of production facilities. Third round expansion talk starts up again.

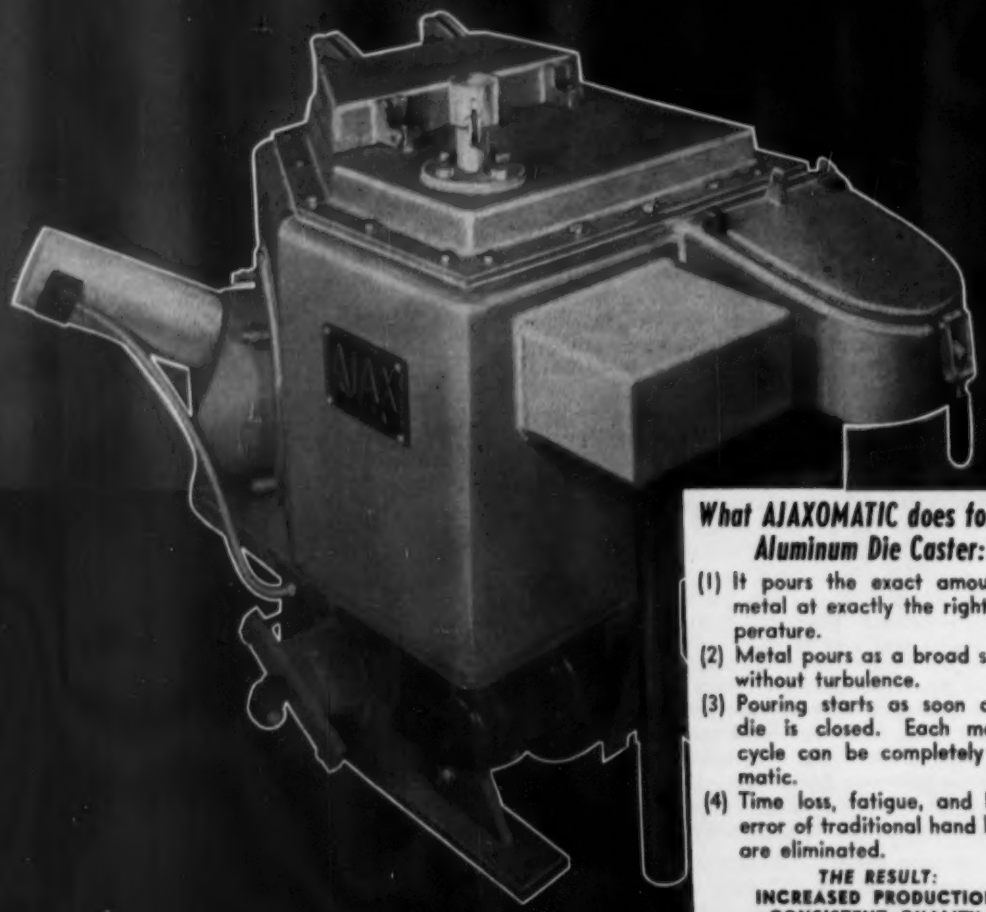
NEXT WEEK:

BETTER TITANIUM WELDING WITHOUT FILLER ROD
Welding commercially-pure titanium without filler rod has produced joints with better characteristics than those where filler rod is used. Tests were convincing enough to cause adoption of the technique for limited production of turbo and ramjet parts. Without a rod, the argon blanket remains unbroken.

NEW PROGRAM BOOSTS LAGGING SHIPBUILDING
Shipyards will soon be stepping up their demands for steel, nonferrous metals and machinery as government programs take effect. Five hundred million dollars are available. Indications now are that government contracts are going to be coming out of Washington at a faster rate—means more pressure on steel.

AJAXOMATIC

AN AUTOMATIC POURING UNIT FOR THE PRODUCTION OF ALUMINUM DIE CASTINGS



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Indexed in the Industrial Arts Index and the Engineering Index.

ABP NBP

Editorial:

What's Happening Steelwise?

◆ IF STEELMAKERS had their way there would be a steady flow of steel orders to the mills—no deep valleys and no high peaks. Such a state of affairs is one which most steel executives dream about. There are times when they fervently pray for it to come about. Now is certainly one of those times.

Doing business is not yet a completely cold blooded punch card, objective and logical process. Nor is it likely to fit such a pattern in your life or in mine. So steel people will have to do a lot of dreaming and praying before we get rid of the sharp peaks and valleys in steel demand and production.

Most steel officials were reluctant to make expansive estimates of this year's steel output. Such reluctance is natural. To overestimate publicly is not always good public relations. This may be a good place to dispense temporarily with reluctance. Here goes:

Review: Incoming steel order volume hit bottom in November 1953. But because of backlogs the steel ingot rate held up longer than did orders. The ingot rate hit bottom (about 62 pct of capacity) in July 1954. In the fourth quarter of 1954 steel demand and production outran the most optimistic statements of anyone in the steel industry.

Current Picture: Steel operations are near the alltime peak reached in March of 1953. There is belated realization by many consumers that their stocks are too low in relation to their own business and in relation to availability of steel. The race is on to get on future mill rolling schedules.

Future Outlook: This year (we repeat) operations will average about 85 pct of capacity or 106 million tons of steel. Railroads will soon be in the market for larger tonnages of steel. Auto people will begin model changes earlier this year than last with less time for changeover. Defense order placing is going up in the face of world conditions. Exports to Britain and Europe will be a big factor in steel before the end of the year. Our recovery will progress.

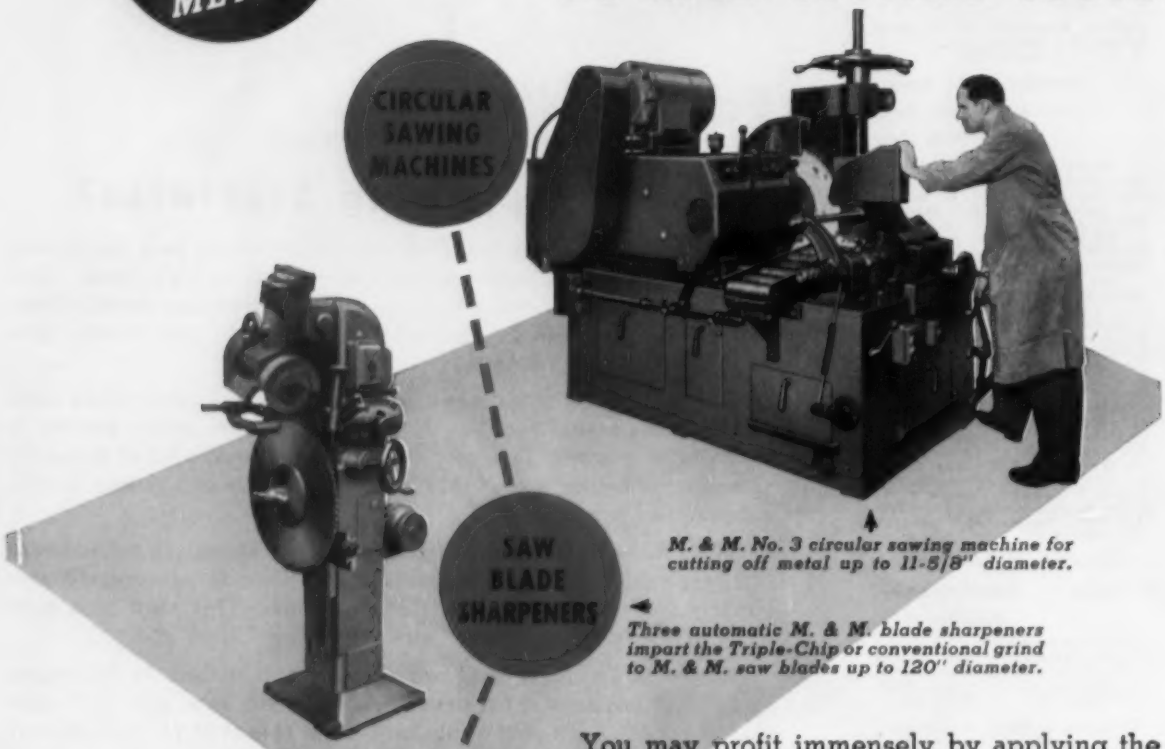
If you are fearful of labor strife—all that does is postpone the demand and make conditions more hectic when the hassle is settled. There are at least two good solid years ahead for steelmen—and their customers.

Tom Campbell

EDITOR

Francisco, Seattle, Montreal, Que., Toronto, Ont.

THE Triple-Chip METHOD IS A *Triple-threat* TO HIGH CUTTING COSTS



M. & M. No. 3 circular sawing machine for cutting off metal up to 11-5/8" diameter.

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dear editor: letters from readers

Vacuum Steel Process

Sir:

We certainly appreciate the loan of the original German manuscript and translation on the "BV" vacuum steel process.

IRON AGE got the jump on the other U. S. publications, and your willingness to lend us these manuscripts is greatly appreciated. *R. B. Corbett, Director of Research, Heppenstall Co., Pittsburgh.*

A Look at the Future

Sir:

The picture on the Feb. 24 front cover of IRON AGE (New Departure's sketch: Automatic Home Laundry 1965?) will certainly be something to look forward to in the years to come, but I would like to call attention to the fact that you would not wash colored socks with linens and white shirts as you have pictured. Only one that has had the experience of having a colored sock slip in with white clothes would think of this, and believe you me this is a horrible experience. *Mrs. Eugene Annen, Valparaiso, Ind.*

Perhaps all dyes will be fast by 1965.—Ed.

Alloy Steels

Sir:

It would be most appreciated if you would send me three tear sheets of the following article which appeared in the Feb. 24 issue: "Continuously Cast Wide Range of Alloy Steels" by J. Selron. *N. W. Bass, Vice-President, The Brush Beryllium Co., Cleveland.*

Ferro-Manganese Furnace

Sir:

In your July 8 issue, p. 99, you have an article by C. H. Good entitled "Ferro-Manganese Furnace Fumes Cleaned Successfully."

It is stated in this article that in the shops of U. S. Steel Corp., Duquesne, 135,000 cubic feet per minute are treated daily; these gases are produced by two ferro-manganese furnaces. Does this figure designate the total production of gas of both furnaces? In such case, was not a mistake made in printing or is only a part of the gas released treated? *M. L. Deribere-Desgardes, Manager of Documents, Institute de Recherches de la Siderurgie, St. Germain-en-Laye, France.*

The 135,000 cubic feet per minute is the total capacity of the five electrostatic precipitators in this plant.—Ed.

Machinability Report

Sir:

I am a subscriber to THE IRON AGE and have interest in getting the original report that was the basis of your articles on machinability found in the 1954 issues of IRON AGE starting May 6 and finishing July 22.

Your magazine made reference to the "United States Air Force Machinability Report, 1954." Would you please advise whom to contact in order to get a copy of this report? *L. W. Rinek, Universal-Cyclops Steel Corp., Bridgeville, Pa.*

The Air Force Machinability Report was published in book form by the Curtiss-Wright Corp., Wood-Ridge, N. J., for the Air Force.—Ed.

Vibration Control

Sir:

The Feb. 24 issue of THE IRON AGE has an article entitled "Proper Mount Design, Selection Aid Vibration Control" by Mr. E. A. Johnson, vice-president of The Barry Corp., in which I am very much interested. If you have a tear sheet of this article available, I would appreciate receiving a copy. *W. E. Fink, AC Spark Plug Div., General Motors Corp., Flint, Mich.*

What does "S. B." mean to you?

To some, it means Strictly Business. To others, it means a "Secretary-Boss" relationship. But, to thousands who want smooth-running machinery, it means Small Balls . . . Small Balls by Universal . . . true-to-round, even when they are no larger than a mustard seed.

We make them up to 1" in diameter in chrome, stainless, bronze, solar, aluminum, and special materials. Customers say they are Sure Better.

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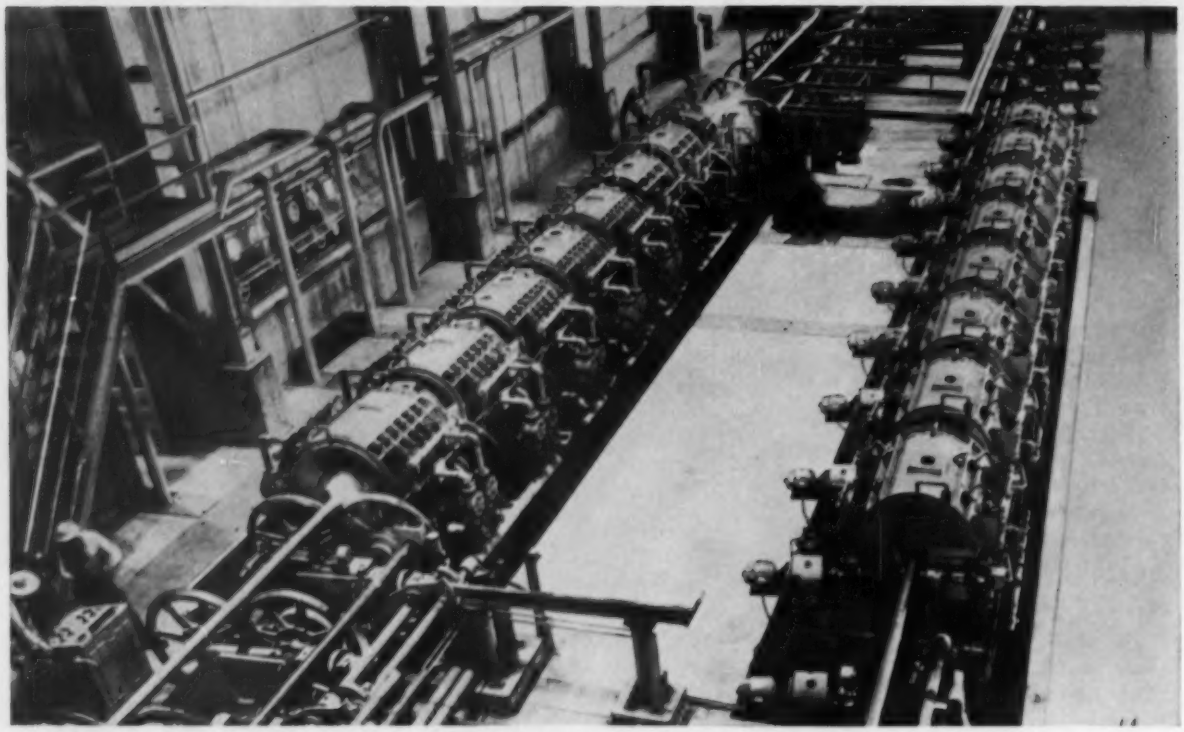
PIPE TREATED ON NON-STOP BASIS



IMPROVED PHYSICAL PROPERTIES, and significant savings in alloying elements are obtained when seamless steel pipe is uniformly hardened and tempered in this continuous, completely automatic line of gas-fired Gradiation furnaces . . . pipe is straight and scale-free. *Photo courtesy Colorado Fuel and Iron Company.*

SELAS
HEAT PROCESSING
AT WORK

● Selas Gradiation heating is the key to improved efficiency wherever you use heat for processing. In *heat treating, brazing, forging, strip annealing,* and other continuous operations involving both ferrous and nonferrous metals, Selas Engineers can design heat processing equipment to help speed production, improve product quality and reduce manufacturing costs.
Write for descriptive data.

CONTROLLED HARDNESS PATTERN is achieved in flame surface hardening of gears, segments, cylinders, using Selas heat processing. *Photo courtesy Wiedemann Machine Co.*

DECREASED FORGING TEMPERATURE and virtual elimination of scale formation are benefits of Selas Gradiation heating. Die life is increased . . . billet weight reduced 10%. *Photo courtesy Lansdowne Steel and Iron Company.*

SELAS

SELAS

CORPORATION OF AMERICA
PHILADELPHIA 34, PA.

fatigue cracks

by William M. Coffey

Où est le poulet?—Voltaire

We honestly and absolutely have nothing to write about this week. We could again tell you that THE IRON AGE is 100 years old this year and that you all are going to get a free 600-page issue "100 Years of Metalworking" in June —and that after writing over 100 of these columns we feel 100 years old, too. But what good would that do. To heck with it.

We told the editor we have nothing to say this time and proposed we leave the whole thing blank (which would closely approximate the state of our mind) but he never heard of anything like that being done and he *didn't* say if you don't do it I'll get somebody who can, which is what we've been after for some lengthy period, so we'll just have to keep talking in this vein until we reach the puzzlers.

And right here we advise you to skip everything and go right to the puzzlers. Because as we've said we absolutely have nothing to say this week. The weather today is very nice. And here's a picture which was sent to us from Armco and which takes up a tidy little bit of space. We blew it up as much as we could, needless to say.

Armco tells us this is a picture of a chicken wearing safety glasses. Seems that chickens cut themselves shaving, leaving little blood specks around. Other chickens, having a fond taste for blood, and being cannibals at heart, take to chewing up the wounded chicken. Many chickens are lost that way. So Armco comes up with a pair of safety glasses (they must be competing with American Optical Co.) through which blood can not be seen so that if they don't see blood they don't start hacking away at the aforesaid wounded chicken. One owner of a large flock declared that the use of glasses on his chickens saves him 250 out of every 5000 chickens, and that's plenty of drumsticks. The way you put these things on is to stick an Armco stainless steel cotter pin through the nostrils and just hope the chicken doesn't sneeze himself to death.

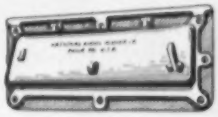
Puzzlers

Because we had so much to say up above, we are now forced to give you the answer and winners to one of the shorter puzzlers—the one about digging ½ a hole. You can't dig half a hole and that's the answer. Winners: Dave Kuhn, Bart Shapleigh who was doubtful, Jim Mull and Marilyn, good ole A. H. Peirce, good ole Joe Brugman, Walter Semmerling, Jr., and R. C. Hess. Charlsie and Equation Experts Encorporated missed out—but Charlsie's letters are so nice we just must thank her.

New Puzzler

And Charlsie and the Club send us this one. What is a number ending with 3 which is such that when removing the 3 from the right end of the number and placing it on the left end or as the first digit of the number, the new number just formed will be equal to exactly three times the original number?

A Complete Line of COMBUSTION ACCESSORIES for Every Industrial Liquid Fuel-Gas Installation

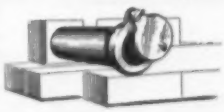


Air Control Door and Frame, top hinged, ratchet type, heavy duty, for manual control. Surfaces are machined to a close fit.

Fuel Oil Suction Strainer, single type. Large basket area insures low pressure drop; cover and basket easily removed for cleaning.

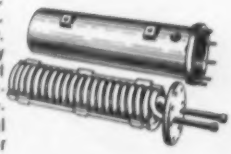
Wide-View Peephole, safety, curtain type. Cobalt glass removed to show bearing surface for curtain. Curtain halves are interlocked—open simultaneously.

Ignition Port with Refractory Tile No. M896 . . . for use with standard 3" pipe. Also serves as a peephole.



Furnace Relief and Access Door, heavy construction, practically air tight. Door casting correctly weighted, lined with plastic refractory retained by imbedded grill; with observation port and cover.

Fuel Oil Heater, Self-Cleaning, Spiral Coil Type. High oil velocity in coil, resultant turbulence prevents carbon formation. No internal connections or joints.



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Double ground lead for easy pressing into the jig. Radius into the hole — to prevent tool hang-up, wear and breakage.

Two way undercut under the head to insure squareness to the jig.

100% concentricity inspection.

Internal ground holes to insure straightness.

Original 3-D ordering method eliminating confusing code numbers.

Patented bushings for plastic tooling.

Complete local stocks.

Send for free catalogs showing complete line.

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SPECIALIZING ONLY IN DRILL JIG BUSHINGS

dates to remember

MARCH

PORCELAIN ENAMEL INSTITUTE—Pacific Coast conference, Mar. 10-11, Biltmore Hotel, Los Angeles. Institute headquarters are at Dupont Circle Bldg., 1346 Connecticut Ave., N. W., Washington, D. C.

STEEL FOUNDERS' SOCIETY OF AMERICA—Annual meeting, Mar. 14-15, Drake Hotel, Chicago. Society headquarters are at 920 Midland Bldg., Cleveland.

AMERICAN SOCIETY OF TOOL ENGINEERS—Annual meeting Mar. 14-18, Shrine Auditorium and Exposition Hall, Los Angeles. Society headquarters are at 10700 Puritan Ave., Detroit.

EXPOSITIONS

NATIONAL ASSN. OF CORROSION ENGINEERS—Annual meeting and Show, Mar. 7-11, Palmer House, Chicago. Association headquarters are at 1061 M & M Bldg., Houston.

AMERICAN SOCIETY FOR METALS—Western Metal Exposition and Congress, Mar. 28-Apr. 1, Pan Pacific Auditorium, Los Angeles. Society headquarters are at 7201 Euclid Ave., Cleveland.

NATIONAL MACHINE TOOL BUILDERS' ASSN.—Machine Tool Show, Sept. 6-17, International Amphitheatre, Chicago. Association headquarters are at 2071 E. 102nd St., Cleveland.

PRESSED METAL INSTITUTE—Spring technical sessions, Mar. 16-18, Hotel Corter, Cleveland. Institute headquarters are at 2860 E. 130th St., Cleveland.

NATIONAL ASSN. OF WASTE MATERIAL DEALERS, INC.—Annual convention, Mar. 20-22, The Conrad Hilton Hotel, Chicago. Association headquarters are at 271 Madison Ave., New York.

INTERNATIONAL ACETYLENE ASSN.—Annual spring convention, Mar. 22-24, Shamrock Hotel, Houston. Association headquarters are at 30 E. 42nd St., New York.

AMERICAN HOT DIP GALVANIZERS ASSN., INC—Annual meeting, Mar. 24-25, Brown Hotel, Louisville. Association headquarters are at 1506 First National Bank Bldg., Pittsburgh.

AMERICAN MACHINE TOOL DISTRIBUTORS ASSN.—Spring meeting, Mar. 25-26, The Greenbrier, White Sulphur Springs, West Va. Association headquarters are at 1900 Arch St., Philadelphia.

STEEL SHIPPING CONTAINER INSTITUTE, INC.—Annual meeting, Mar. 29-31, Biltmore Hotel, Palm Beach, Fla. Institute headquarters are at 600 Fifth Ave., New York.

APRIL

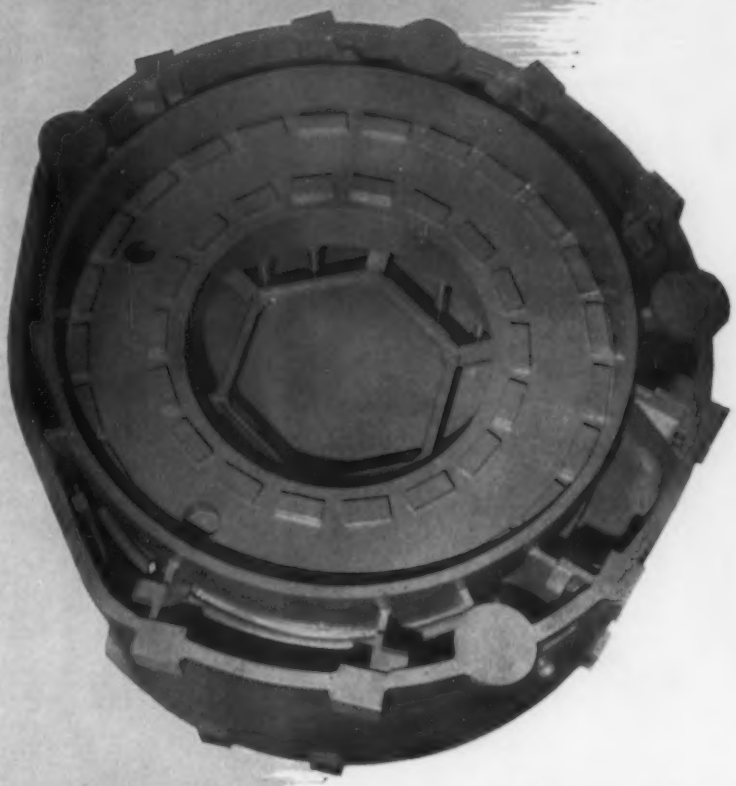
AMERICAN HARDWARE MANUFACTURERS ASSN.—Spring meeting, Apr. 10-14, Palm Beach, Fla. Association headquarters are at 342 Madison Ave., New York.

WIRE REINFORCEMENT INSTITUTE INC.—Spring meeting, Apr. 11, The Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are at National Press Bldg., Washington, D. C.

CONCRETE REINFORCING STEEL INSTITUTE—Annual meeting, Apr. 11-16, The Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are at 38 S. Dearborn St., Chicago.

AMERICAN SOCIETY OF LUBRICATION ENGINEERS—Annual meeting and exhibit, Apr. 13-15, Sherman Hotel, Chicago. Society headquarters are at 84 E. Randolph St., Chicago.

Believe it or not!



a Machine Tool Weldment

Bases like this, Fabricated by Acme excel in Strength, Rigidity, and Precision Finish . . . save Weight and Cut Costs.

No Design is too complicated . . . not even Yours!

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"The Facts about Weldments and Castings"

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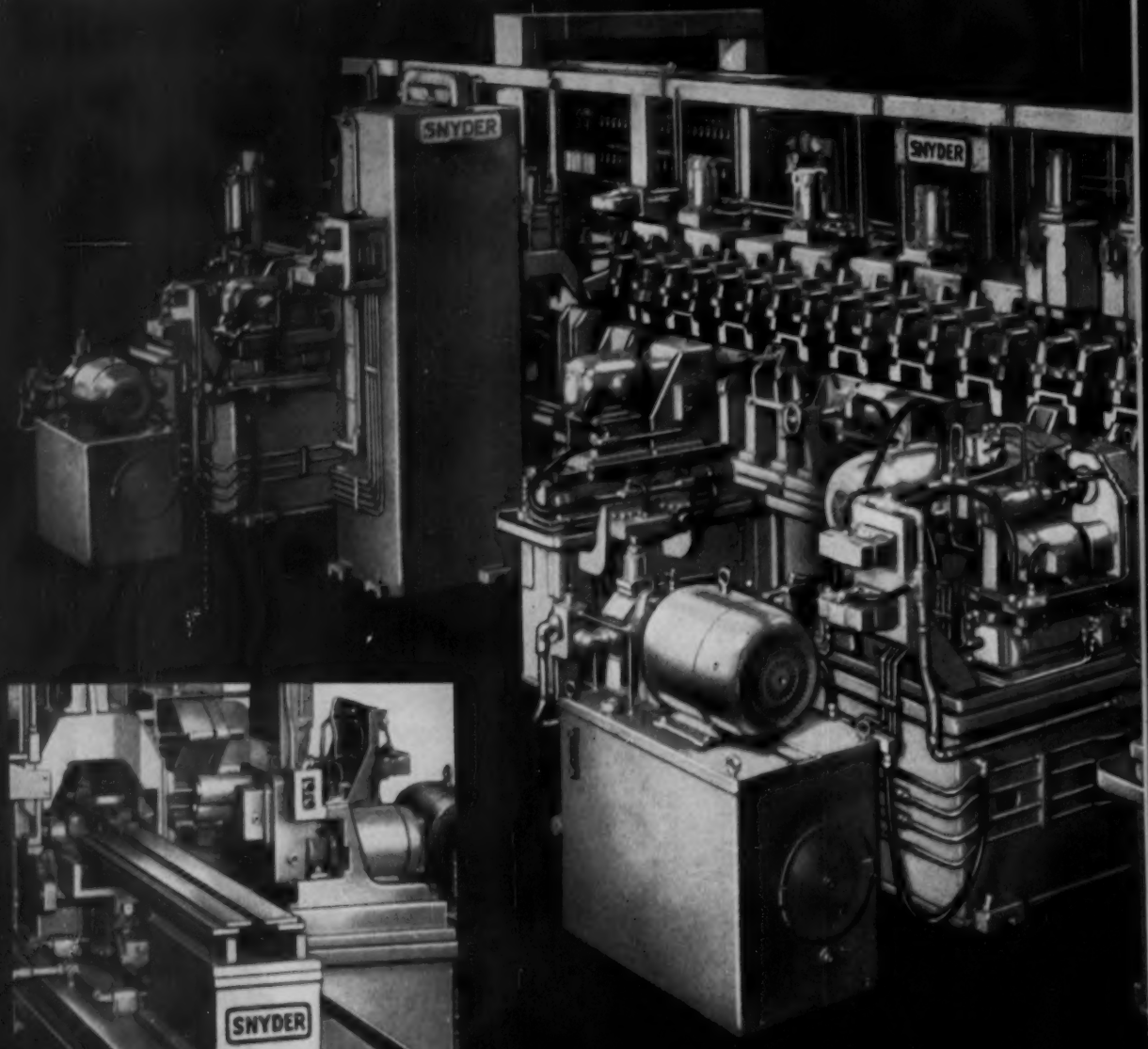
TRANSMISSION EQUIPMENT CO., Inc. • 441 LEXINGTON AVE., NEW YORK 17, N. Y.



This is the discharge end of the machine. The part, which is originally in vertical position, is laid horizontally and swung 90° to expose all sides to the tools.

SNYDER SPECIAL automatic

24-station transfer machine for processing automotive water pump housings; drills, mills, faces, chamfers, taps all holes and probes tap drill holes. Production, 81 pieces an hour at 80% efficiency.

SNYDER

TOOL & ENGINEERING COMPANY

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30 Years of Successful Cooperation with Leading American Industries

Sharp Clean Cuts EVERY TIME

Many thicknesses and sizes of metal are cut on this Steelweld Shear every day. Thanks to Steelweld's exclusive MICRO-SET knife adjustment, it is easy to set the knife clearance to the exact amount which will produce the best cut for every plate run through the machine.

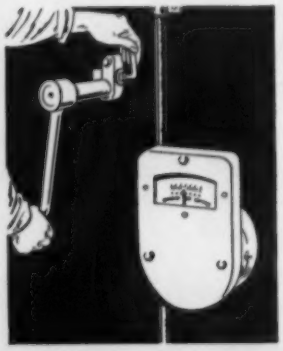
If desired, the knife clearance can be set for an average thickness and all plates cut without changing the clearance. This procedure is used with most shears because to change knife clearance on them is a tedious, difficult operation which usually puts a machine out of service for hours.

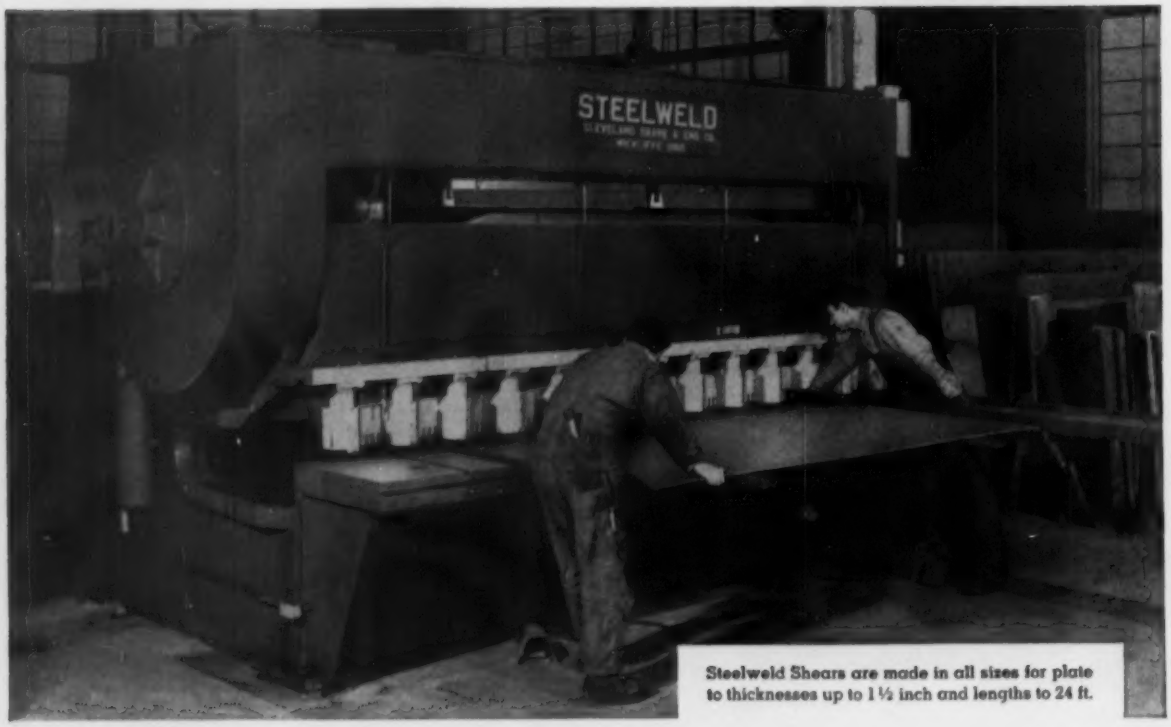
In contrast, knife adjustment on Steelwelds is made in a few seconds. It's simply a matter of turning a crank until an indicator points to the figure representing the thickness of plate being cut. No bolts to loosen; no parts to move. There is no need for using "average" knife settings.

The clutch and brake unit is another outstanding feature of Steelweld Shears. As it is air-operated, it is quick, snappy in action. Its low-inertia design assures cool operation, even after long continuous production runs, because energy to be dissipated is minimized and working pressure necessary on clutch and brake facings is greatly reduced.

The many features of Steelweld Shears make it worth your while to get all the facts.

Because of MICRO-SET Knife Adjustment





Steelweld Shears are made in all sizes for plate to thicknesses up to 1½ inch and lengths to 24 ft.

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CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

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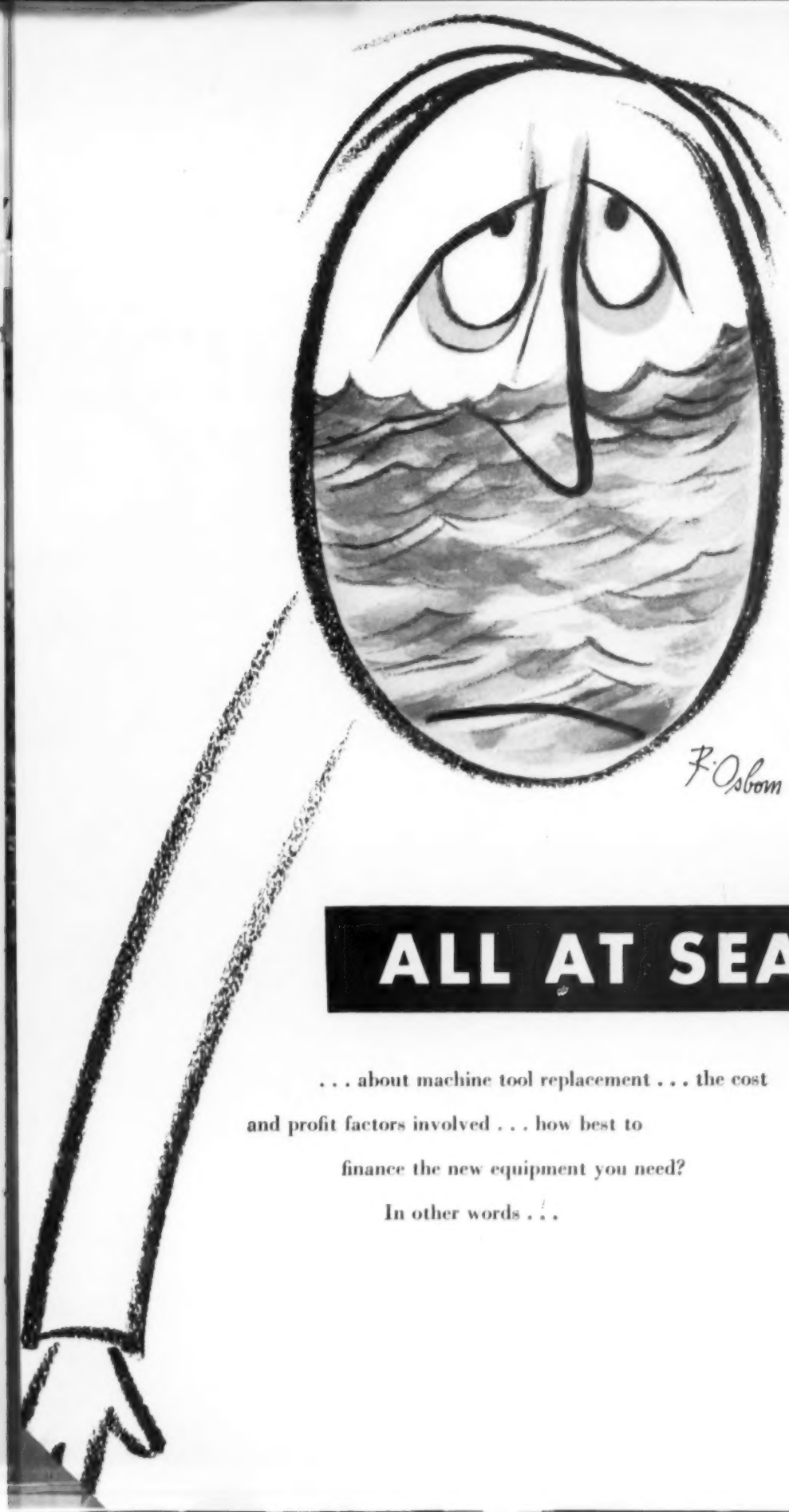
STEELWELD PIVOTED BLADE SHEARS



ALL AT SEA?

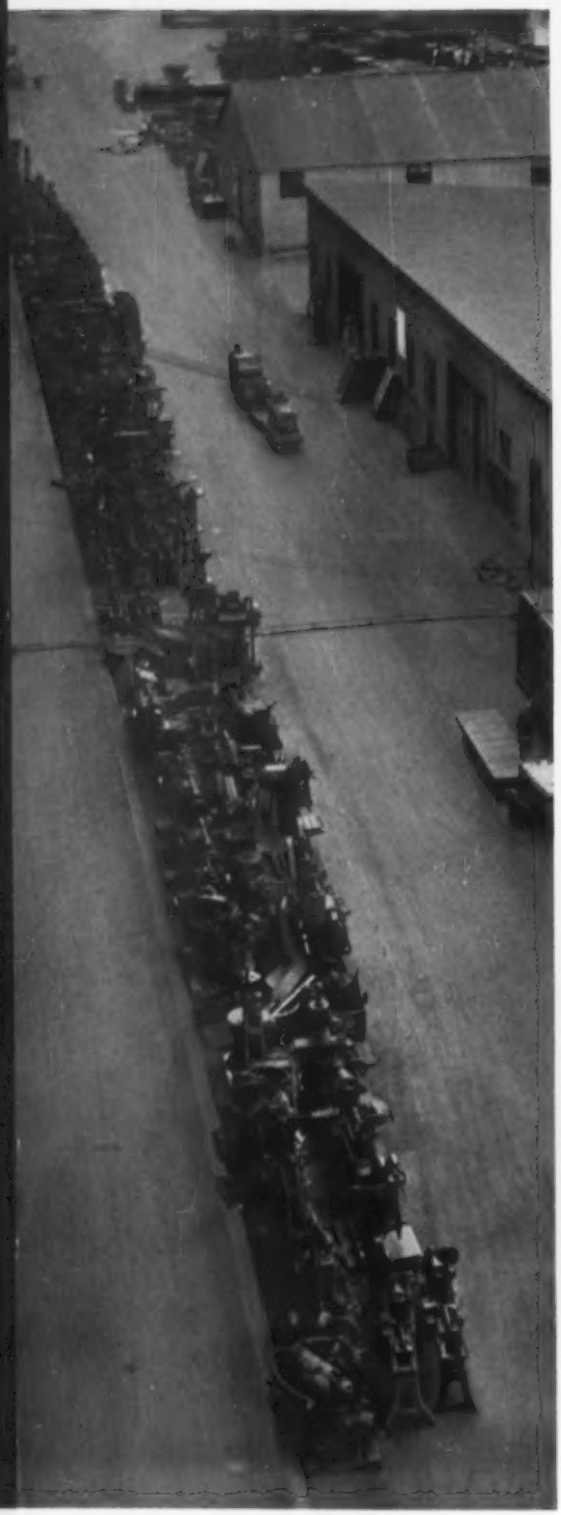
. . . about machine tool replacement . . . the cost and profit factors involved . . . how best to finance the new equipment you need?

In other words . . .

Is there such a thing as...

A PRACTICAL REPLACEMENT PROGRAM?

YES! – and Jones & Lamson can help you develop it



Industry unanimously endorses the idea of planned replacement of capital equipment. Nevertheless, most of America's machine tools are more than 10 years old, sadly inferior to today's profit-producing equipment. The idea is sound — but action is lacking.

Biggest reason for this paradox is financial. Until recently, replacement required a substantial outlay of capital. In many cases, needed capital was lacking; in others, the capital, though available, had many other calls upon it. Unrealistically low depreciation allowances on capital equipment served as an added deterrent to replacement.

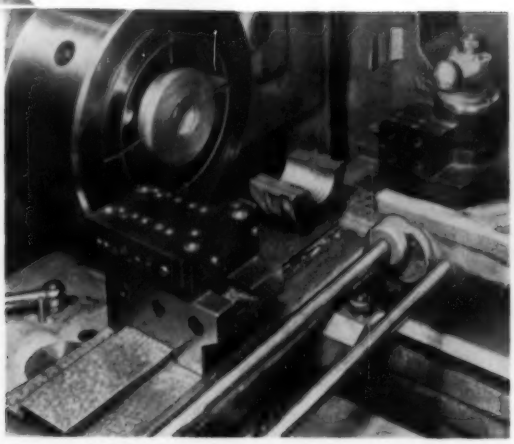
The picture has changed. Now, provisions of our new tax laws permit more equitable write-offs, and make replacement a more attractive proposition.

Jones & Lamson makes replacement even *more* feasible, by clearing away the traditional difficulties of financing with its unique Procurement Plans.

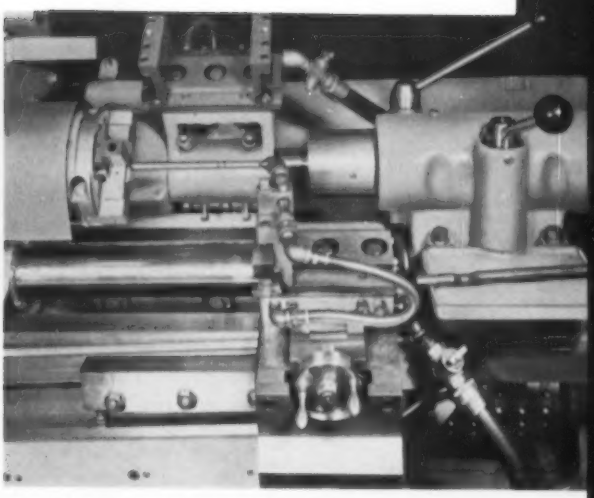
This, then, is what Jones & Lamson offers: modern machine tools that can greatly improve your production; *plus* your choice of several sound, low-cost (interest rates of 3¼%, and lower, add-on) methods of procuring these tools.

OBSOLETE machine tools like these hamper industrial growth, keep production low, and costs high.

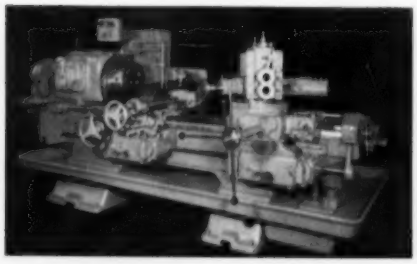
RESEARCH in machining methods, metallurgy, tool geometry, is carried on continually by J & L. Important findings have resulted in the incorporation of unique engineering features in J & L machines.



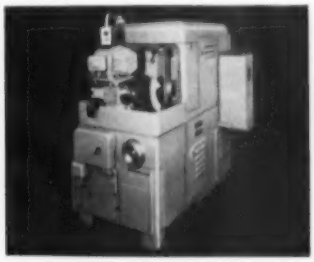
IMPROVED production on this difficult machining job was made possible by J & L engineers' close co-operation with the customer. Research testing, and incorporation of special features on a J & L turret lathe cut time-per-piece on this bottle neck-ring from 14 to 5½ min., increased production 120%!



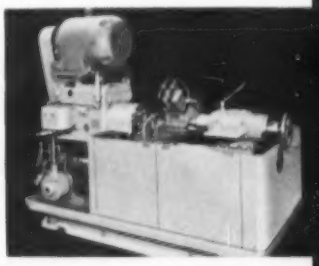
AUTOMATIC OPERATION. One Fay Automatic Lathe replaced eight engine lathes formerly used on this job — and substantially increased production of sewing machine crankshafts at the same time.



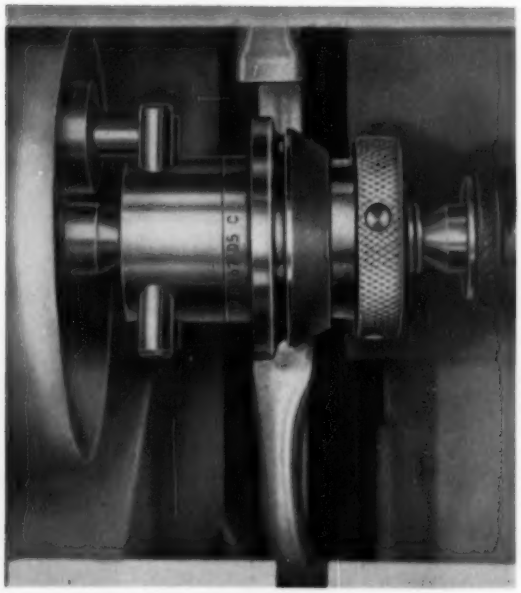
Universal Turret Lathes



Automatic Thread & Form Grinders



Fay Automatic Lathes



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The Jones & Lamson BC-7 Optical Comparator

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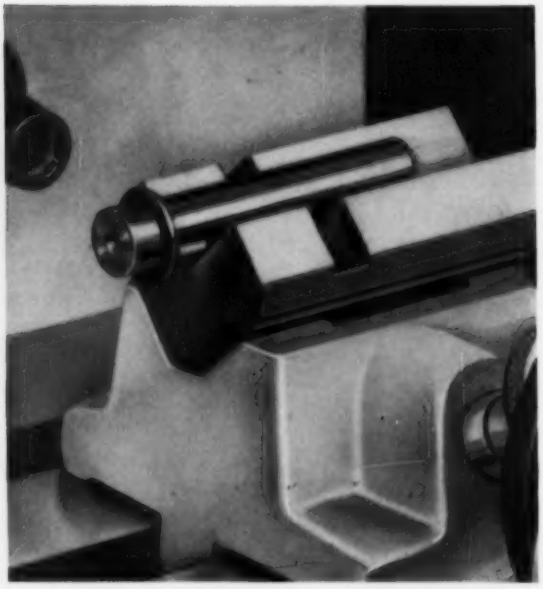
The inspection of "O" rings is a good example of the difficult jobs that are easily handled by the J & L BC-7 optical comparator. The rubber rings are held on a simple plug gage which duplicates their positioning in final assembly. The operator then merely looks at the chart on the viewing screen to check for thickness and amount of flash. The chart is a standard grid, laid out in .050" squares which represent .001" on the "O" ring at 50 magnifications.

There is *no* danger of distorting the piece as there would be in mechanical gaging. Only this one gage is used, because the optical comparator inspects in *all* planes.



By merely changing the fixture and chart, a great variety of totally different parts can be inspected accurately and economically.

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VASCO SUPREME — Highest hardness, highest wear resistance, supreme in the field. (U.S. Pat. 2174286).

NEATRO — Resistance to abrasion exceeds all steels except Vasco Supreme. Excels for both heavy and light cutting.

VAN CUT — High carbon, high vanadium. Properties intermediate between Vasco M-2 and Neatro for easier grinding. Suitable for all types of cutting tools.

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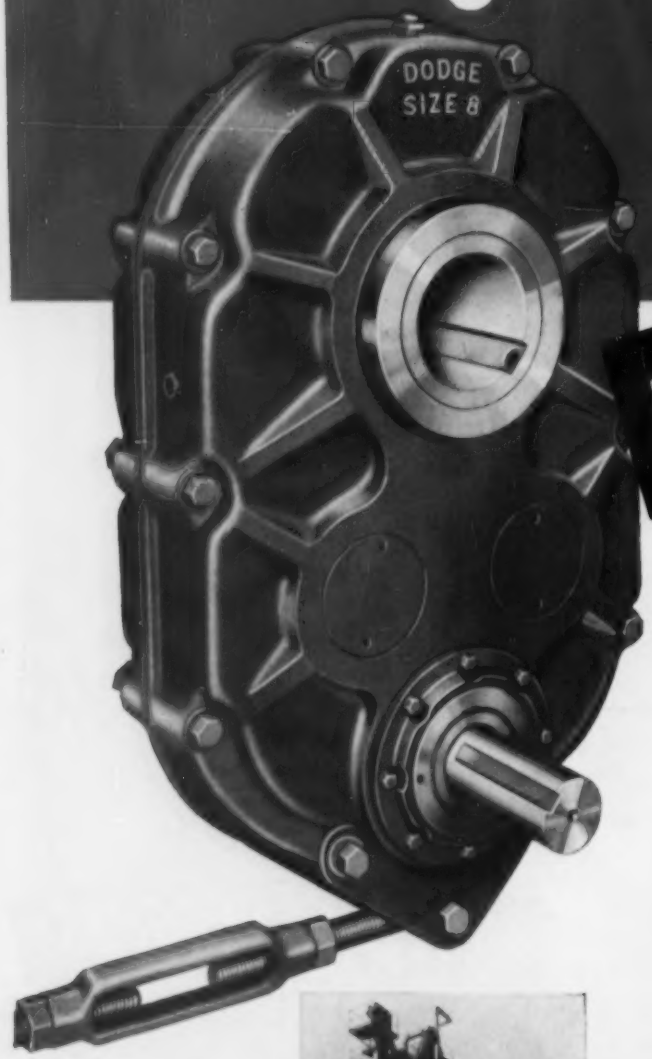
DODGE Torque-Arm

America's most complete



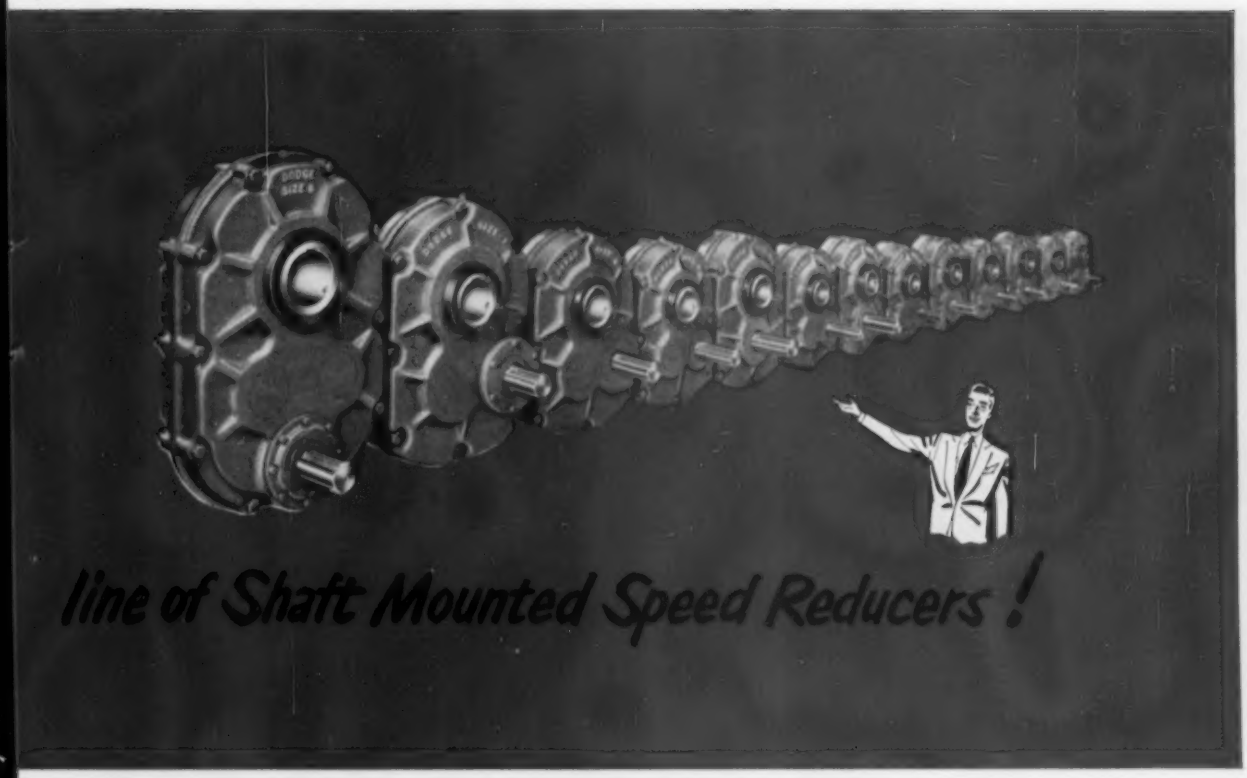
NOW-

SAVINGS EXTENDED TO YOUR BIG JOBS WITH THIS NEW 60 H.P. SHAFT-MOUNTED SPEED REDUCER!

All the advantages of shaft-mounting . . . all the proven performance and economy features of Dodge Torque-Arm Speed Reducers . . . are now available for your *big* jobs. The husky new size No. 8, in the double reduction series, has a capacity of 60 hp at 100 rpm, AGMA rating, and can be mounted on shafts up to 5-inch diameter.

The performance record of Torque-Arm Speed Reducers, as demonstrated in tens of thousands of installations, shows efficiency up to 97%, and substantial savings in costs. These advantages will be even more significant in the big installations for which this newest addition to the line is provided.

Torque-Arm Speed Reducers driving the trunnions rotating an asphalt kiln.



line of Shaft Mounted Speed Reducers!

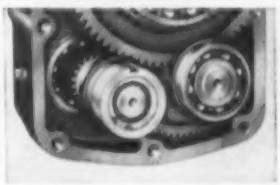
The new No. 8 has all the inherent advantages of the Dodge Torque-Arm line. No foundation, no flexible couplings, no sliding base required—and there are no lining up difficulties. It is mounted directly on the shaft. The torque-arm, fastened to any fixed object, anchors the reducer. The unit is driven through V-belt drive. Dodge Taper-Lock Sheaves, available from stock, permit any speed ratio desired.

Another new member of the Torque-Arm line is the single reduction No. 11 (1.3 hp at 100 rpm, AGMA rating). Torque-Arm Reducers are now supplied, in both single and double reduction series, with capacities from 1 to 60 hp, output speeds from 12 to 365 rpm. All sizes are available with built-in backstop as well as the Tri-Matic Overload Release which is designed especially for the Torque-Arm Speed Reducer.

For detailed information and recommendations for applications to your needs, call the Transmissioneer, your local Dodge Distributor. Or write for Bulletin.

DODGE MANUFACTURING CORPORATION, 800 Union Street, Mishawaka, Indiana

Tri-Matic Overload Release, optional, loosens the belts, cuts off power, gives a warning in case of an excessive load.

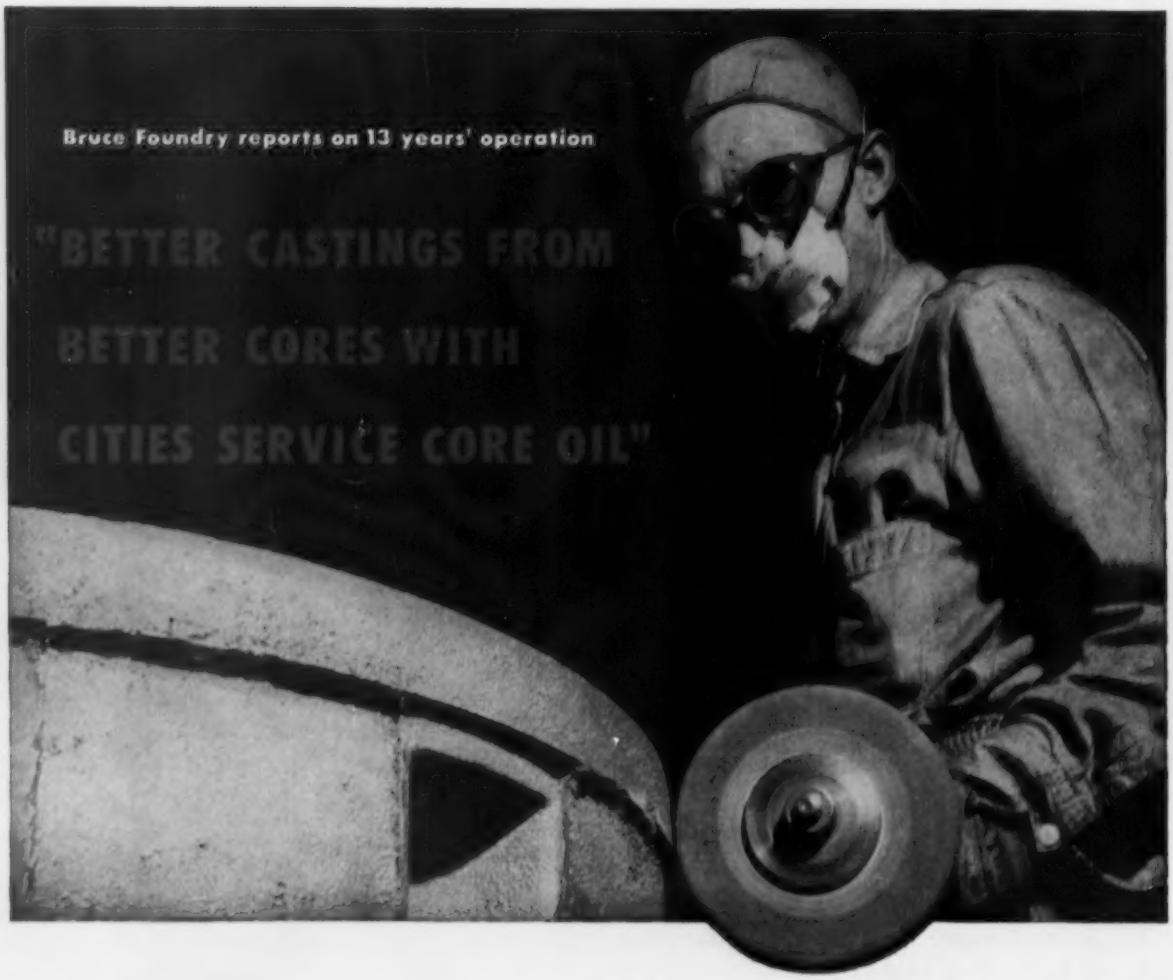


Built-in backstop is available when conditions require a device to prevent the reversal of direction of rotation.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE

of Mishawaka, Ind.



PRESIDENT WILLIAM J. BRUCE is high in praise for Cities Service Core Oil. Says it prevents premature collapsing, eliminates sticking, permits minimum smoke and offers absolute uniformity. Great in every respect.

Located in Tecumseh, Michigan, Bruce Foundry and Mfg. Co. has a melting capacity of 30 to 40 tons per day. For many years Bruce has turned out top-notch castings for refrigeration and automotive hydraulic equipment.

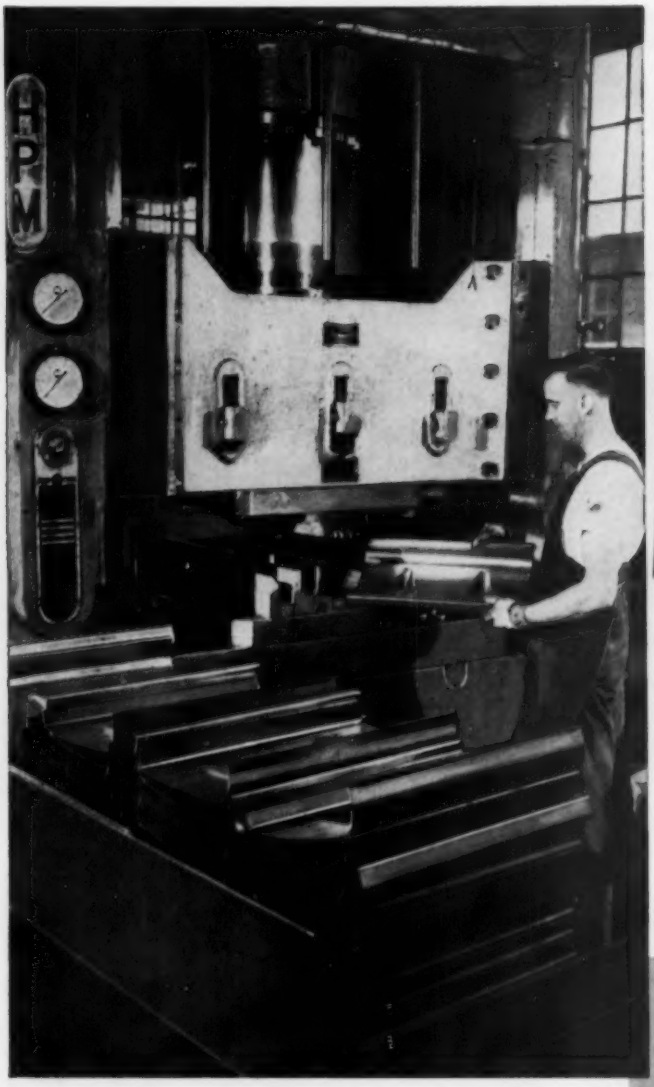
And for thirteen of those years, Cities Service Core Oil has been a major factor in the quality and rapidity of Bruce's work. Probably no one is better qualified to comment on this oil than President William J. Bruce. Here's what he says: "One of the biggest reasons I can think of for recommending Cities Service Core Oil is its absolute uniformity. This we have discovered in every single order for 13 years. As for foundry performance, I don't think there's a better oil. It has high hot strength preventing premature collapsing, yet collapses rapidly at the right time so that sand doesn't have to be dug out of castings. In addition, it eliminates sticking and permits minimum smoke."

If you'd like to learn more about the oil Mr. Bruce praises so highly, talk to a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N.Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

AFTER REMOVAL FROM CORE BOX, sand core gets attention from skilled technician at Bruce Foundry. Firm makes castings for automotive and refrigeration hydraulic equipment, has used Cities Service Core Oil for 13 years.



the BUSIEST press at LENNOX FURNACE

no downtime reported for this H-P-M Hydraulic

If you've a spot for a real "workhorse" let the Lennox story prove a point. This versatile H-P-M 400 ton press is used for drawing, blanking, forming and other operations and is really paying its way in production output at The Lennox Furnace Company. H-P-M's constant drawing speed . . . smooth fast operation . . . shockless reversal . . . positive overload protection . . . and quick die set up put your toughest metalworking jobs in the profit column. Call in a nearby H-P-M engineer to analyze your parts production. There's no obligation — write today.

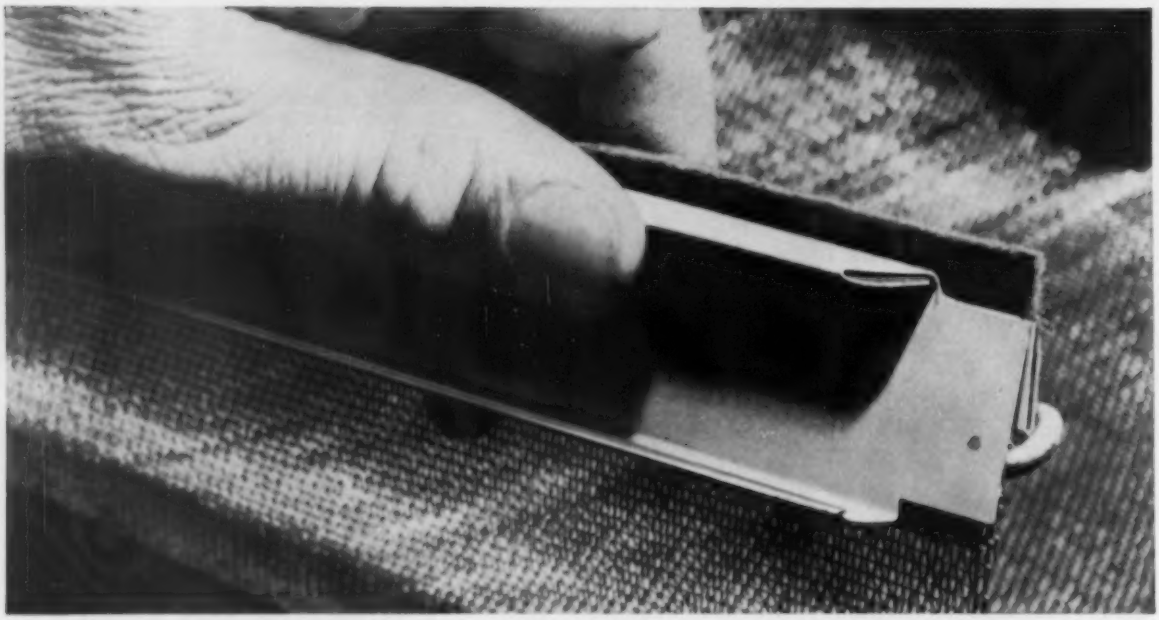
"We've operated our H-P-M, 19 hours a day for the past several years without any downtime — it's the workhorse of the shop!"

Mr. James H. Bragg
Factory Manager
Marshalltown Plant of
The Lennox Furnace Co.

HPM

THE HYDRAULIC PRESS MFG. COMPANY
1004 MARION ROAD
Mount Gilead, Ohio, U. S. A.

Manufacturer *Bends* Enamelstrip 180° without paint cracking!



Sharp edges on bottom bar of roll-away screen are bent back double, and the felt insect-proof seal is bent 180°. Despite severity of bends, Enamelstrip coating withstands cracking and flaking.

Pre-Coated Coil Ups Sales of Roll-Away Window Screens

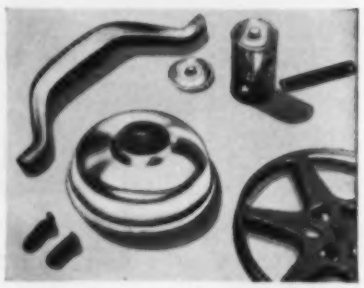
A serious sales problem was easily taken care of when the Rudiger-Lang Co. in California started fabricating the exposed metal parts of its roll-away window screens from Enamelstrip coil.

Previously, stores had to put Rudiger-Lang window screens on display with the exposed metal parts unpainted. Some of the edges were bent back double, which made it impossible to paint these parts of the screens before installing them.

After changing to Enamelstrip Pre-coated Coil, however, Rudiger-Lang was able to stamp out and bend parts 180° where necessary—without worrying about the paint cracking, chipping or flaking. The need to paint after installation was eliminated, and the sales appeal of the window screens on display increased considerably.

This story about product improvement is just one of the many that have been made possible by Enamelstrip. Today, hundreds of manufacturers are saving up to 50% on their production costs. They are feeding continuously from a coil of the exact size they need and reducing scrap losses . . . eliminating the expense of cleaning, tumbling, spraying, dipping, rust-proofing, baking, drying . . . making sure they won't be getting back any scratched or damaged products.

So why not let Enamelstrip show you how to make substantial savings on your costs? You can choose pre-coated coils in widths from 7/32 to 30 in. In steel, brass, zinc, aluminum, or any base material that takes a coating. In a wide variety of finishes. In colors from one end of the spectrum to the other. Just call or write.

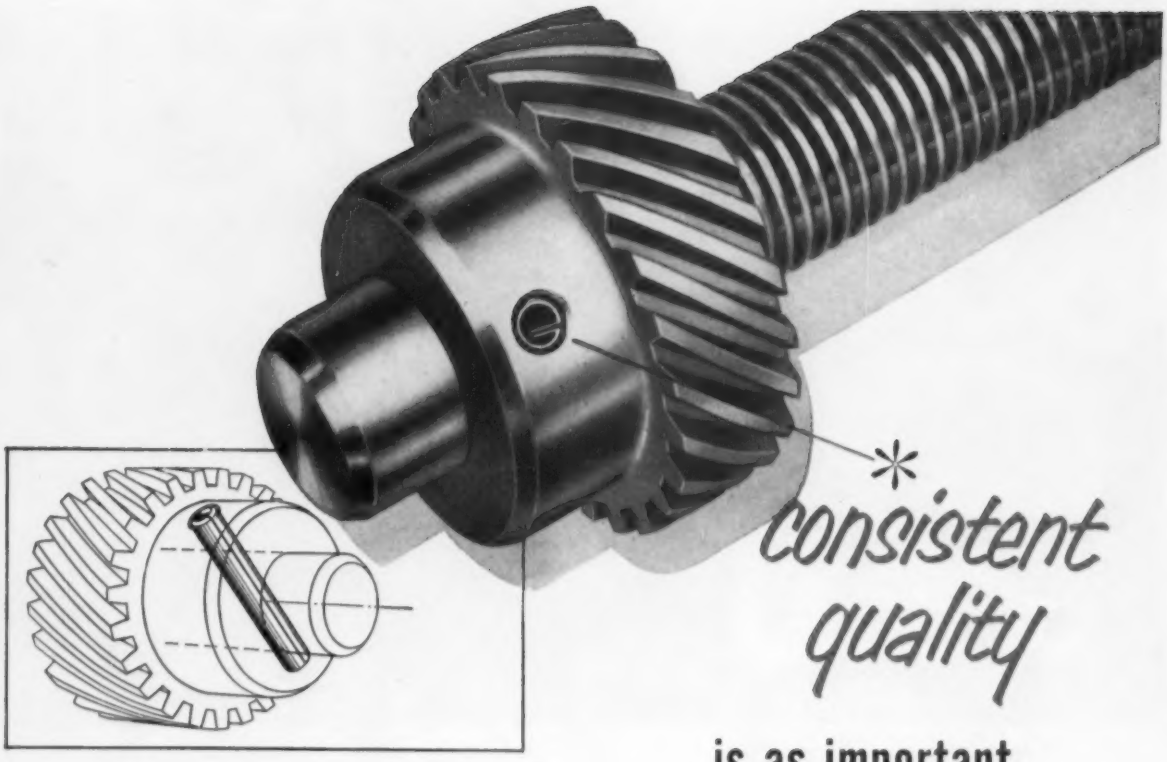


Some of the other products being made from Enamelstrip today include: Tags, Toys, Screw Caps, Containers, Buckles, Appliance Accessories, Lighting Fixture Parts, Picture Frames, Envelope Clasps, Flashlight Batteries, Ash Trays, Movie Reels, Venetian Blinds, Electric Stoves, etc.

THE COATED COIL CORPORATION

511 West 30th Street, New York 1 • LOngacre 5-3161

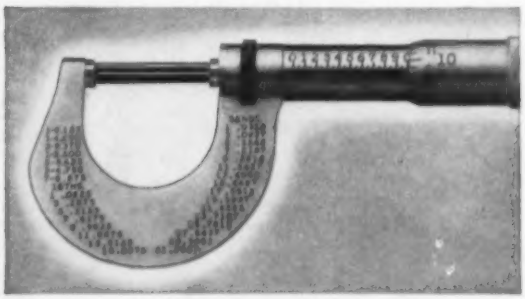
National Sales Representatives for Enamelstrip Corp., Allentown, Pa.



*consistent quality

is as important in the pin as in the gear

To function effectively, a spring pin must drive easily into holes drilled to normal production tolerances, compressing as driven. To drive easily, hold firmly and fit flush, the pin —*every* pin—must meet the strict requirements of specifications such as those prepared by the SAE and the Military Services.



Since failure of a pin can be as costly as a failure of any other precision part, it is important to check the pins *you* buy for uniformity . . . uniformity of diameter and length, shear strength, hardness, insertion and removal forces, and recovery of diameter.

Rollpin has been tested many times—by many manufacturers—with a consistently high performance record. It has been widely recognized as the "quality" fastener of its type. In this case, quality can be—and should be—measured. We strongly urge that you test for quality when buying spring pins.

ELASTIC STOP NUT CORPORATION OF AMERICA

Elastic Stop Nut Corporation of America
Dept. R28-377, 2330 Vauxhall Road, Union, N. J.

Please send the following free fastening information:

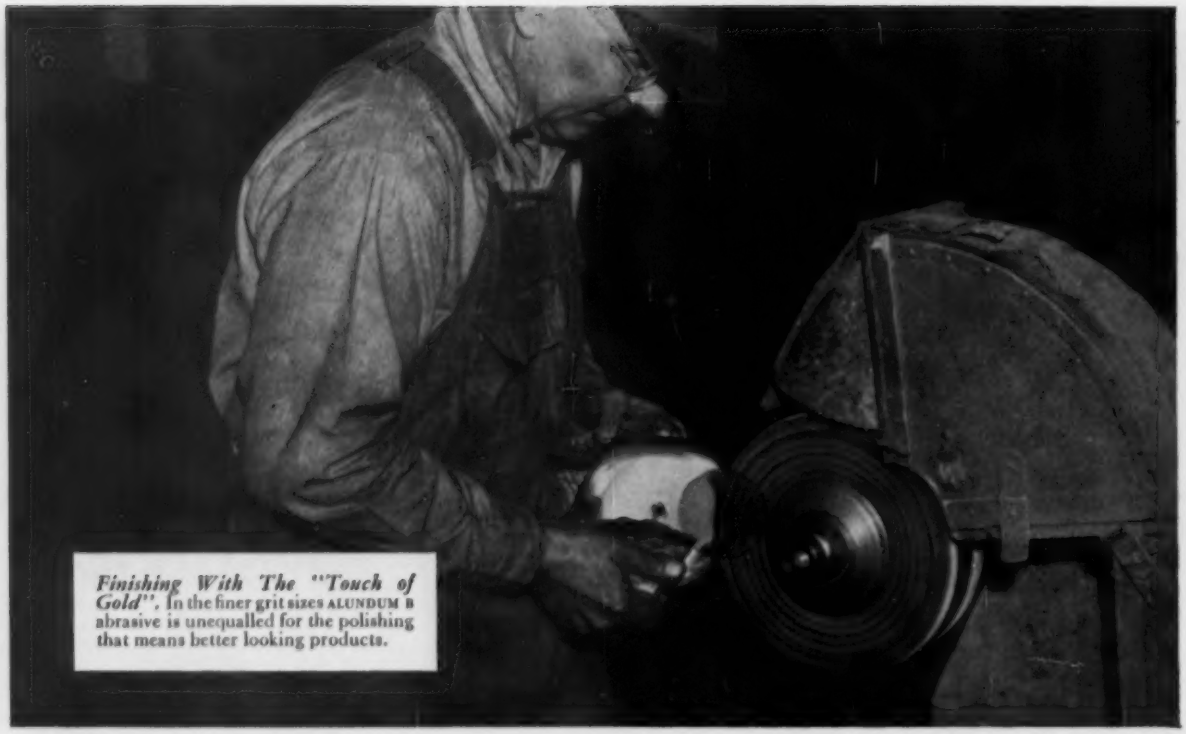
☐ Rollpin samples
☐ Rollpin bulletin
☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name_____ Title_____

Firm_____

Street_____

City_____ Zone____ State_____



Finishing With The "Touch of Gold". In the finer grit sizes ALUNDUM B abrasive is unequalled for the polishing that means better looking products.

Across the range of polishing jobs . . .

Norton ALUNDUM* B Abrasive

adds the "TOUCH of GOLD" that steps up production and profits

Roughing With The "Touch of Gold" ALUNDUM B abrasive in the coarser grit sizes, removes stock faster, saves time and money.

In Norton ALUNDUM B abrasive you get a truly all-purpose polishing grain, expertly engineered to cut costs and improve product quality "across the board" in your polishing operations. Here are some typical advantages that mean top performance in every set-up:

- ***Uniform grain shape,*** the result of careful processing that eliminates flats and slivers, leaving only solid, blocky grains that stand up better and polish faster.
- ***Uniform grain sizings,*** with no oversize grains that mar the finish, no undersize grains that skip their share of work.
- ***High capillarity,*** assuring the easy absorption of adhesive that means longer lasting, better performing set-up wheels.
- ***Usable with cement or glue,*** it is equally firm-clinging and efficient with either.
- ***Made in all grit sizes*** from 20 through 240, to cover the widest range of polishing jobs, from roughing to fine finishing.

See your Norton Distributor for prompt deliveries of Norton ALUNDUM polishing abrasive. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

G 283

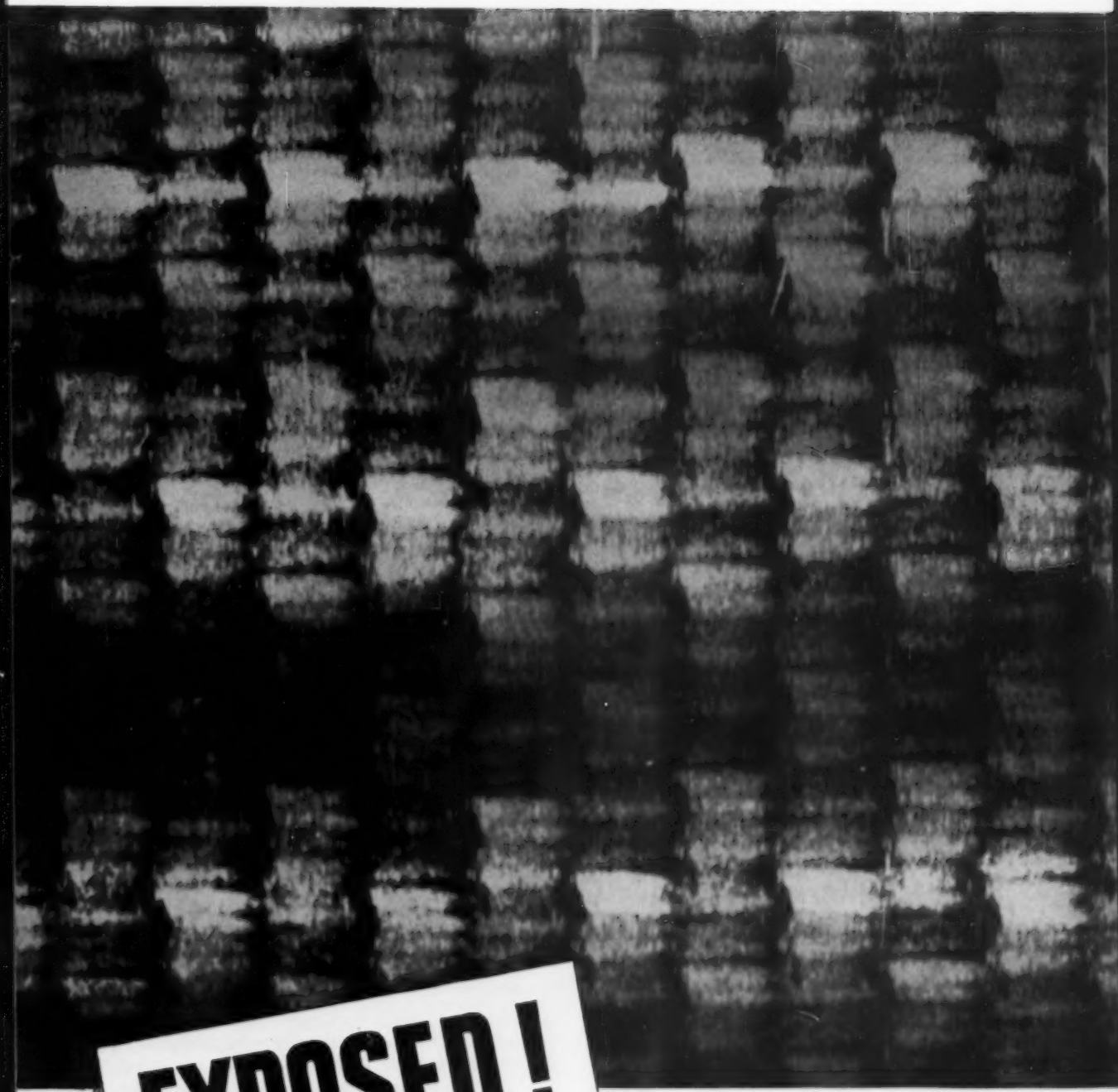
Making better products . . . to make your products better

NORTON

and its BEHR-MANNING division

NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries



EXPOSED!

by SUPERFINISH

Here, in an enlargement of a 3/4" section, you see the grinding defects —*chatter and feed marks*—left on a ground surface which was previously considered acceptable. Partial Superfinishing shows them up. Complete Superfinishing will remove them . . . and produce a bearing surface which will last infinitely longer.

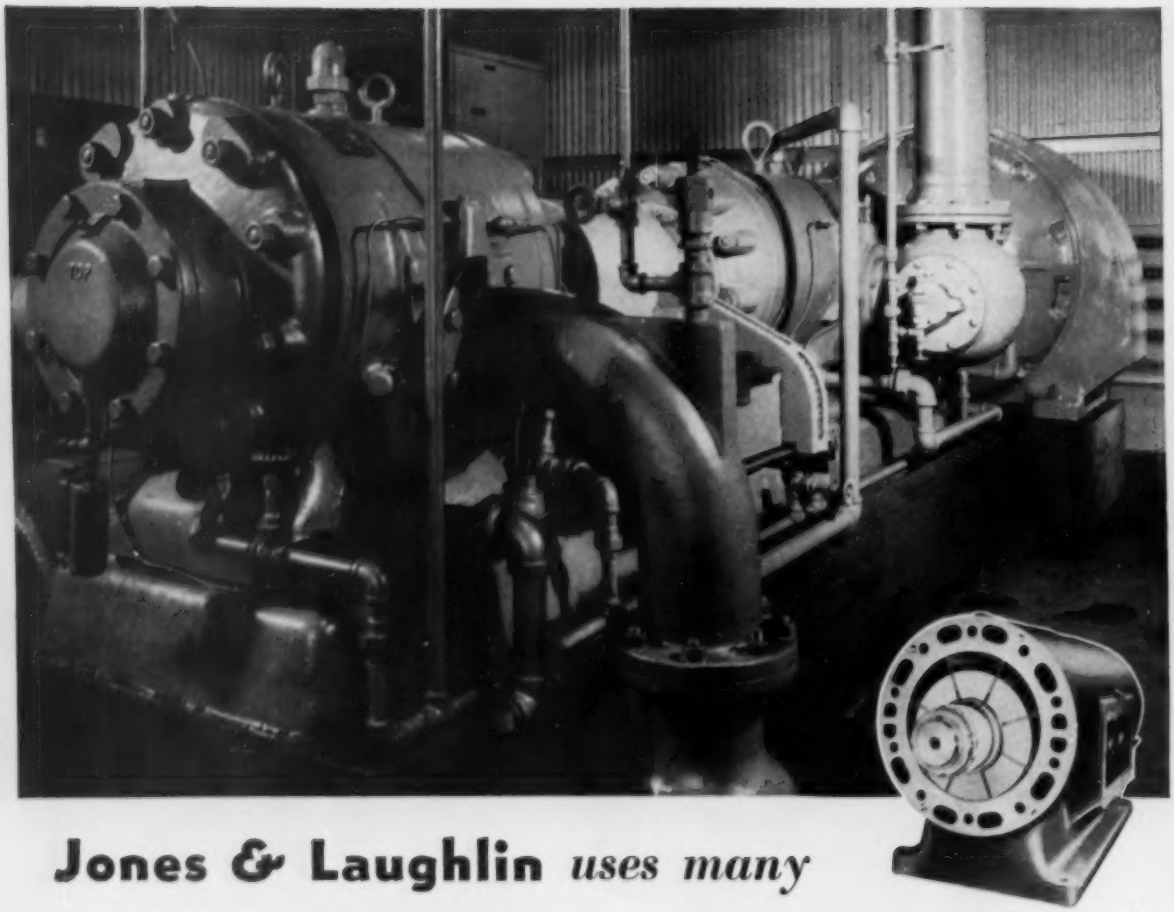
Superfinishing is a quick and inexpensive process which more than pays for itself in better performance, longer life and reduced service problems. The booklet, "Wear and Surface Finish," will be sent upon request. Please use your company letterhead.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

TURRET LATHES • AUTOMATIC LATHES • BALANCERS • SUPERFINISHERS • SPECIAL MACHINES



Jones & Laughlin *uses many* Fuller Rotary Compressors

Like many other steel producers and fabricators, from the East to the West Coast, Jones & Laughlin Steel Corporation has purchased and uses many Fuller Rotaries in its various mills. Illustrated above is a Fuller Rotary Two-stage Compressor, having a capacity of 1660 c.f.m. 120-lb. pressure, installed in the P-1-10″ bar mill of the Pittsburgh Works Division.

Endurance, plus efficiency and maintained capacity, flow of air without pulsations, elimination of vibration, are results of the rotary principle employed in the design of the Fuller Compressor. They can be placed on comparatively light foundations, on balconies or upper floors to save valuable floor space and shorten distribution lines. Employing a minimum of moving parts—rotor, bearings, blades—greatly reduces maintenance and eliminates adjustments entirely.

The cylinders of a Fuller two-stage machine are at ground level, mounted on a common base plate, and are connected by a flexible coupling. Installation is very simple, the motor being lined up to the coupling on the shaft extending from the low-pressure cylinder. This arrangement simplifies motor maintenance work as compared with many other types of machines.

Due to extremely low inertia and WR^2, Fuller compressors, which operate in speed ranges of 600 to 1750 r.p.m., according to size, and are directly coupled to the motor, may be installed with either a general purpose or a normal torque synchronous motor, as dictated by size and the electrical requirements of the plant. Standard motors are available for all sizes of Fuller compressors in either squirrel cage or synchronous types.

For full information, write for Bulletin C-5A.

Fuller

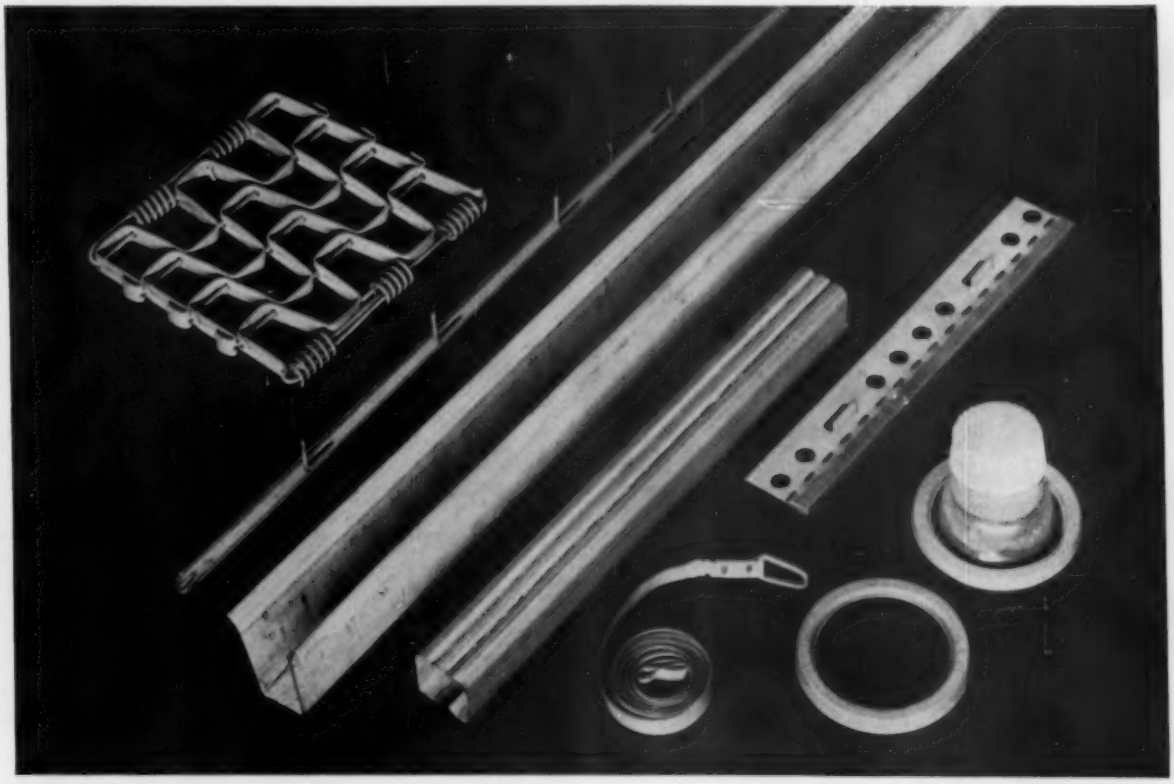
FULLER COMPANY, Catasauqua, Pa.

Chicago • San Francisco • Los Angeles • Seattle • Birmingham

C259
1292

PIONEERS OF HIGH-EFFICIENCY VANE-TYPE ROTARY COMPRESSORS

• BRAINARD ELECTRO-GALVANIZED STEEL



How to provide parts with a BUILT-IN PROTECTIVE COATING—at low cost!

Specify Brainard electro-galvanized steel when parts require protection against rust and corrosion . . . you eliminate the coating operation. This pre-coated steel eliminates expensive plating and finishing . . . improves product life and appearance.

The galvanized coating—an integral part of the metal—protects both inside and outside of formed and drawn parts . . . is not affected by forming operations. Coating is hard and uniform, with thickness controlled within .0002.

If your parts require such protection, it will pay you to investigate. Let Brainard quote on your requirements.

Brainard
SHARONSTEEL
STEEL DIVISION
SHARON STEEL CORPORATION

Find out how Brainard's new facilities assure you a dependable source of supply. Send coupon for free booklet.

BRAINARD STEEL DIVISION
Dept. O-3, Griswold Street, Warren, Ohio
Please send free descriptive booklet on Brainard electro-galvanized steel.

Name_____

Position_____

Company_____

Street_____

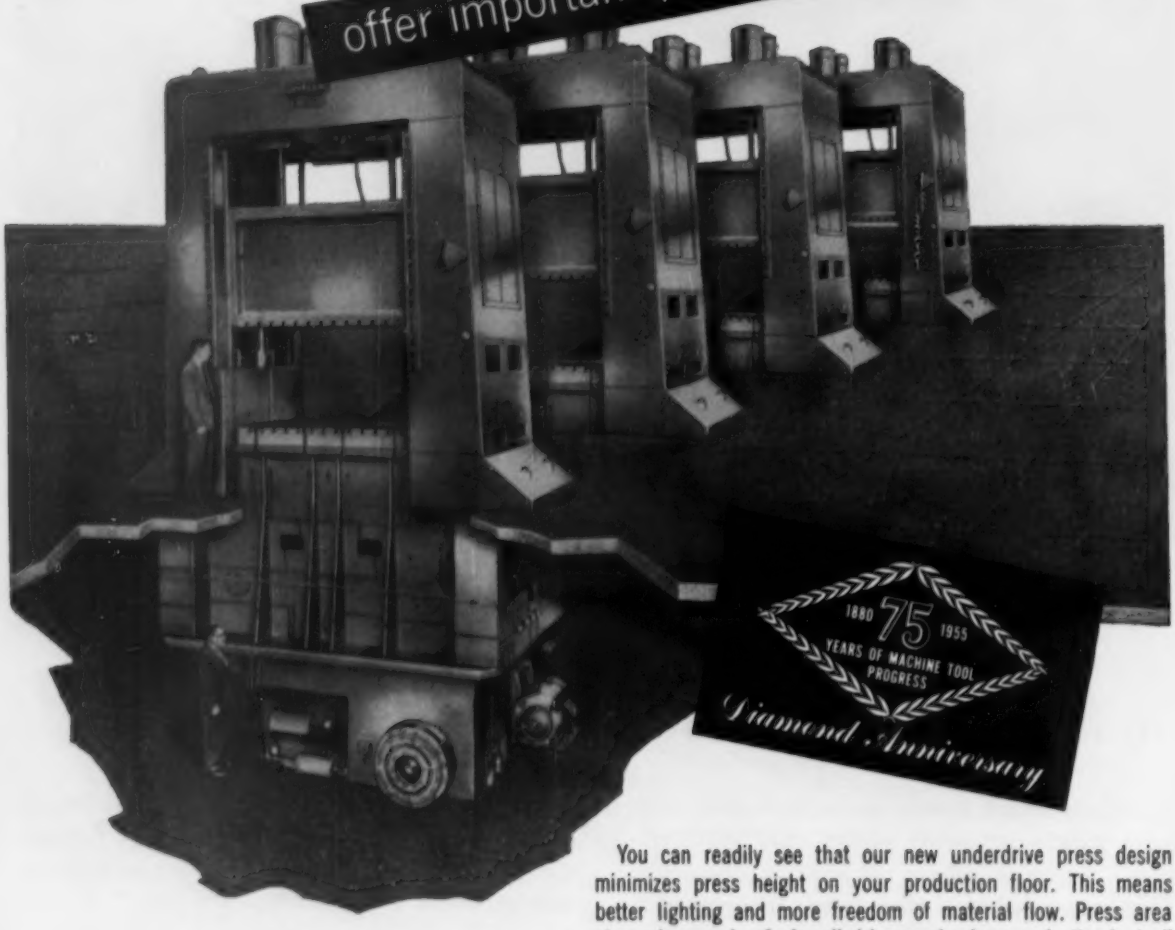
City_____ State_____

COMPLETE STRAPPING SYSTEMS & MATERIALS • WELDED STEEL TUBING • ELECTRO-GALVANIZED STEEL • SCAFFOLDING • PALLET RACKS • BUILDING PRODUCTS

Offices in principal cities throughout the U. S.

Cleveland
UNDERDRIVE
Presses

offer important production advantages!



- **Frees overhead space for material flow.**
- **Enclosed columns keep working parts clean.**
- **Production area is cleaner and safer.**
- **Stress is tension rather than compression.**
- **Faster, more convenient maintenance and adjustment.**

You can readily see that our new underdrive press design minimizes press height on your production floor. This means better lighting and more freedom of material flow. Press area stays clean and safe for all drive mechanisms and attendant oil and grease are in separate area. There are no overhanging projections to interfere with material flow. These presses are readily adapted to automatic feeds.

Many companies have already discovered the important operating economies gained by using Cleveland presses. They'll produce profits for you, too! Whatever your press requirements may be, let us show you why Cleveland presses are your best buy. Our recommendations are based on 75 years of machine tool progress.

AA-562

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880

POWER PRESSES – FABRICATING TOOLS

E. 40th & St. Clair Avenue, Cleveland 14, Ohio

Offices at NEW YORK • CHICAGO • DETROIT
PHILADELPHIA • E. LANSING • OXFORD, O.

CITY FOUNDRY DIVISION · SMALL TOOL DEPARTMENT

The prize-winning 16 mm color movie— "THE SCIENCE OF MAKING BRASS"

"In 30 minutes I learned more about making brass than in a day's trip through the mill."

That's a typical reaction to this dramatic Chase film! "The Science of Making Brass" takes you on a guided tour of Chase mills—shows you exciting, full-color close-ups of every step in the making of brass and other copper alloys in the form of sheet, rod, wire and tube. If *you* work with metals, it's an experience you won't want to miss!

"The Science of Making Brass" is a 16 mm, full-color film with a running time of 29 minutes, and will be loaned to you on request. To arrange a showing, clip and mail the coupon below.

It won these PRIZES First Prize, International Competition for Technico-Industrial Documentary Films, Turin, Italy and Venetia Diploma at Venice Festival.

It won this PRAISE "Far superior..." (Colorado manufacturer) "Excellent in every respect..." (Large eastern manufacturer) "Finest ever seen..." (Texas distributor).

Chase

BRASS & COPPER CO.

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass & Copper

Albany†	Chicago	Detroit	Los Angeles	New York	St. Louis
Atlanta	Cincinnati	Grand Rapids†	Milwaukee	Philadelphia	San Francisco
Baltimore	Cleveland	Houston	Minneapolis	Pittsburgh	Seattle
Boston	Dallas	Indianapolis	Newark	Providence	Waterbury
Charlotte†	Denver	Kansas City, Mo.	New Orleans	Rochester†	(†sales office only)

To: Chase Brass & Copper Co., Incorporated
Waterbury 20, Conn. Dept. IA-355

Gentlemen:

_____ *Please send me more information on your 16 mm, full-color film, "The Science of Making Brass."*

_____ *I would like to arrange for a showing on or about* _____

NAME _____

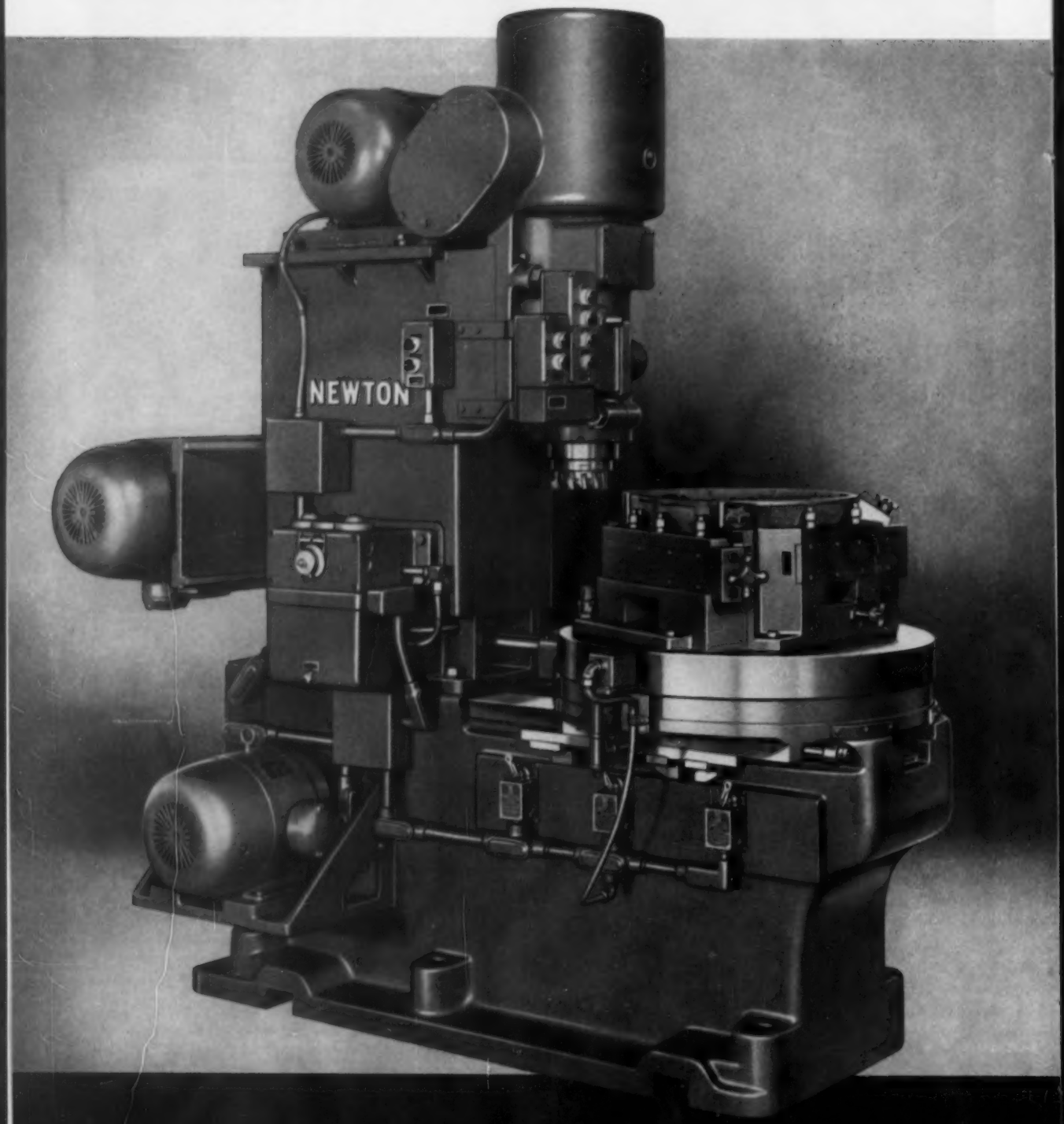
POSITION _____

FIRM _____

ADDRESS _____

CITY _____ STATE _____

For Milling the flanges

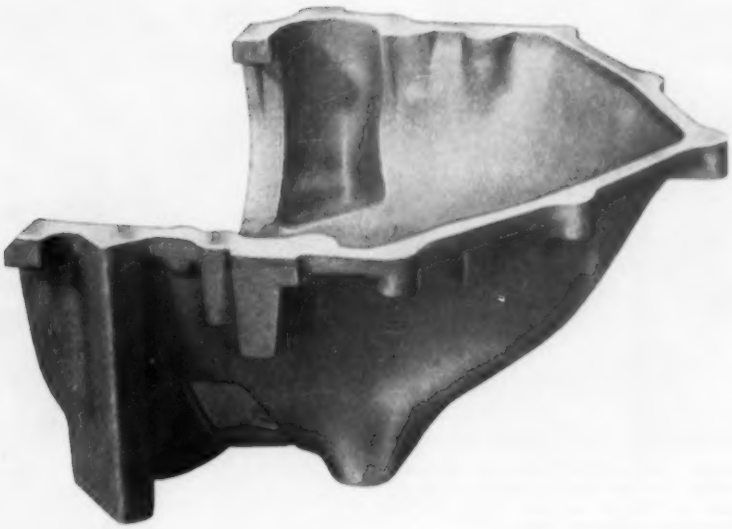


CONSOLIDATED MACHINE TOOL

A Division of Farrel-

of thin Castings...

Newton Vertical Rotaries



- You *can't* mill the flange on this flywheel housing like you would a cylinder block. It's too thin for big diameter cutters.
- But you *can* mill it with a small diameter cutter on a Newton Vertical Rotary and *mill it fast!* All the operator does is load, push a button and unload. A 100 per cent automatic feed and traverse cycle does the rest.
- Of course, it is the *circular feeding of the table* that turns the trick and allows you to use small diameter cutters on this kind of work.

COMPANY, ROCHESTER 10, N. Y.

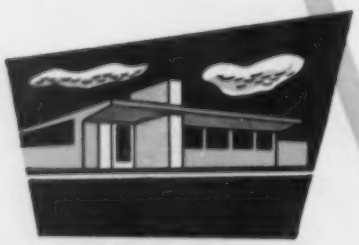
Birmingham Company, Incorporated

MUELLER BRASS CO.

FORGINGS

ARE MADE TO LAST!

QUALITY PARTS AND PRODUCTS FORGED AND MACHINED OF BRASS, BRONZE AND ALUMINUM OR MAGNESIUM



IN THE HOME

IMPELLER DISPOSER

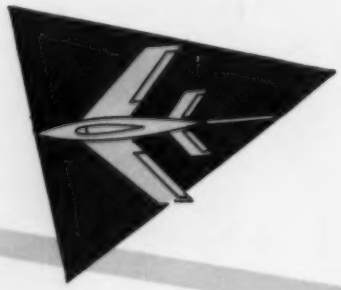
One of four Mueller Brass Co. parts in modern waste disposal unit. Completely dependable in daily operation.

WINDOW HARDWARE

Forged of natural bronze. Can be furnished in aluminum or chrome finish as desired. Retains original beauty indefinitely.

BURNER HEAD

Forged of aluminum for installation in gas stove. Lightweight yet strong.



IN AVIATION

LANDING GEAR TORQUE ARM — **SUPPORT MEMBER** — **INSTRUMENT HOUSING**

These aluminum forgings provide the same strength as steel yet weigh only 1/3 as much. Smooth bright surfaces save machining time and eliminate costly finishing.

Specially designed forged housing for sealing diaphragm in aviation pressure warning unit.

IN INDUSTRY

CONNECTING ROD

Forged from "600" series metal. Over two million connecting rods produced without recorded failure.

ACTUATING GEAR

Forged from special Mueller Brass Co. alloy. Must take constant pounding.

AUTOMOTIVE GEAR

Forged of "600" series metal for use in automotive automatic transmission. Replaced part that was giving constant trouble; solved costly problem.

All Mueller Brass Co. forgings, of which just a few are shown here, have a dense, close-grained structure with a high tensile strength. Weight savings up to 40% are possible in the design of parts because of the close tolerances to which they can be produced. Less scrap and longer tool life result from the easy machinability of forged parts. Mueller Brass Co. is completely equipped to design parts for your products, specify alloys (including special alloys developed by our metallurgists), forge, machine, finish and plate the parts and perform all necessary assembly operations. Write today for our free illustrated 32-page forgings catalog and complete information about MBCo forged parts for your products.

140

MUELLER BRASS CO. PORT HURON 24, MICHIGAN

Exterior view of screw nut machined from steel bar stock:
Cost finished
$5.60
each
Cutaway view of nut redesigned as a cored, Gray Iron casting:
Cost finished 90¢
each

83% saving with Gray Iron

A saving of over 80% on original cost by redesigning in Gray Iron! Also, longer life and improved operating characteristics are provided by the cast part.

This happens every day... someone decides to adopt Gray Iron and confirms its engineering advantages. Have you?

Call your nearest Society member foundry and the full facilities of this association will be available to help you. Or, write direct to Gray Iron Founders' Society, Inc., National City-E. 6th Bldg., Cleveland 14, Ohio, for helpful technical and business information.

MAKE IT BETTER WITH GRAY IRON

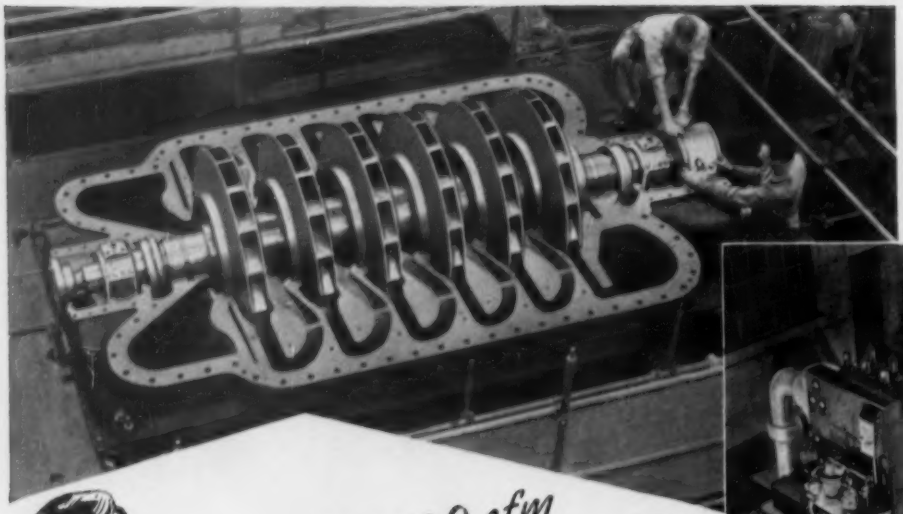
This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

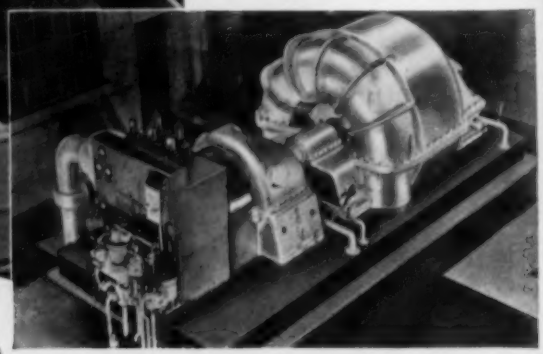
GRAY IRON FOUNDERS' SOCIETY

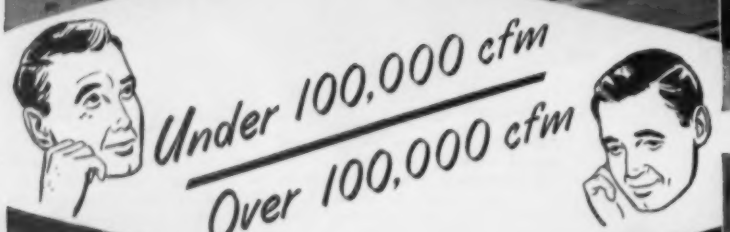
What type BLOWER



Typical centrifugal blower with upper half of casing removed.

75,000-cfm, 30-psig blast furnace blower.





Typical axial compressor of blast furnace size.

Blast furnace type axial compressor with upper half of casing removed.

ALLIS-

for your steel mill?

As requirements move above 100,000 cfm, axial compressor may replace centrifugal blower because of higher efficiency and lower operating cost. Allis-Chalmers experience with both types assures you of sound recommendations.

Battling rising costs, blast furnace designers have sought increased economy through larger blast furnaces. Air requirements of the new units have risen rapidly and have now reached the point where the centrifugal blower is not always the most efficient and economical unit. These are some of the design and operating factors that influence the choice of the best blower for the job:

EFFICIENCY — The axial compressor is inherently more efficient than the centrifugal blower. This is due largely to the fact that the air passing through the centrifugal blower follows a complicated air path, with sharp turns passing from one stage to the next. In an axial compressor, the air path is more nearly a straight line and losses from sharp turns in the air path are avoided.

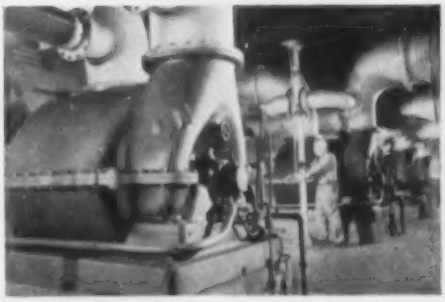
DRIVE UNIT — At 100,000 cfm and above, the speed of a centrifugal blower has dropped below 3600 rpm, while the speed of a comparable axial compressor is approaching 3600 rpm. This difference becomes more pronounced as units get larger. Since the optimum speed of either a turbine or motor drive is about 3600 rpm, the centrifugal makes best use of the drive in smaller sizes, while the axial makes best use of the drive in larger sizes.

SIZE — In all sizes the axial compressor is smaller than a centrifugal blower of the same rating. This means less floor space, smaller foundations, reduced costs.

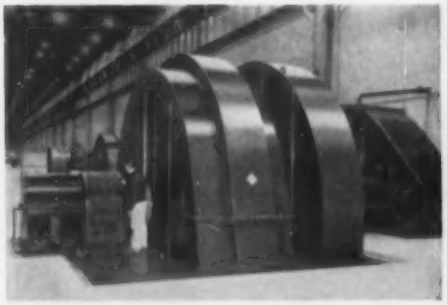
Unbiased Analysis and Recommendations

Since Allis-Chalmers has had wide experience in building both centrifugal and axial types, your Allis-Chalmers representative can help you with your blower problems. Call your nearby Allis-Chalmers District Office or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Other Allis-Chalmers Steel Mill Equipment



Coke Oven Blowers . . . both axial and centrifugal types for booster or exhauster service. Photo shows four 23,000-cfm, 5100-rpm, 35-psig exhausting blowers in western steel mill.



Motors . . . all types of ac and dc steel mill motors. The 3500-hp wound-rotor motor shown is used in conjunction with four 6000-hp synchronous motors driving roughing stands of 80-inch hot-strip mill.

Electric Power Equipment . . . steam turbine-generator units, transformers, switchgear, circuit breakers, rectifiers, control. Shown is a 33,000-kw steam turbine-generator unit with hydrogen-cooled generator supplying power in a modern eastern steel mill.

CHALMERS

A-4611

PLATED UNBRAKOS AT WORK

UNBRAKO FORMULA FOR PLATED SCREW QUALITY. Make the screw precisely undersize with the finest machines. Plate it under rigidly controlled conditions in the best available plating equipment. Guarantee the finished product—Class 3A thread tolerance after plating. It is this unique formula that permits us to supply, with extremely good delivery, the plated UNBRAKO socket head cap screws for such precision applications as this high-speed centrifugal separator used in the processing of fish oils. The story of plating at SPS is told in "Precision Plating—a product and a service." See your authorized industrial distributor or write on your business letterhead for a copy of it. STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

UNBRAKO SOCKET SCREW DIVISION SPS JENKINTOWN, PENNSYLVANIA

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HOW TO BUY RUBBER TRANSMISSION BELT

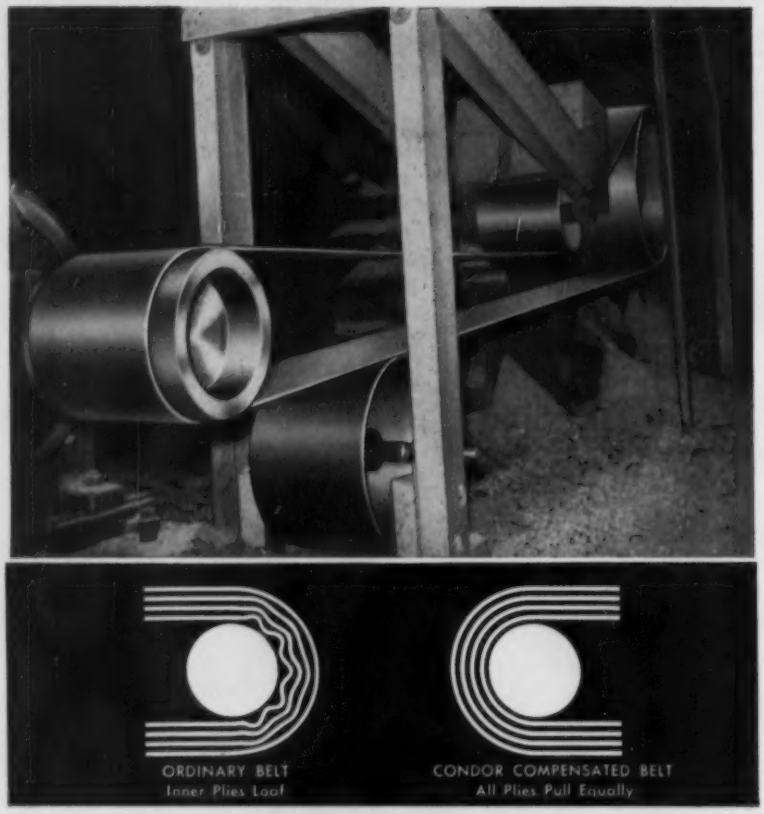
For MORE POWER AND LONGER BELT LIFE

"More Use per Dollar"

Look for a belt engineered to give uniform ply tension and eliminate major causes of premature belt failure.

Unequal distribution of tension among the plies of a rubber transmission belt is the cause of most belt weaknesses and eventual failure. With ordinary belts, the inner plies "loaf", become loosely crumpled when rounding a pulley. Outer plies become overworked . . . pull more than their share of the load. The thicker the belt the greater the tension of these outer plies. It is here where belt failures begin . . . plies separate, outside plies rupture—especially at the fasteners. Where ply stresses are equalized *during manufacture*, every ply pulls its share of the rated horse-power of the belt . . . you get more power, more belt life, longer trouble-free service.

Specify by name the only transmission belt with exclusive equalized ply stresses . . . specify R/M's Condor Compensated Belt.



CONDOR COMPENSATED BELT

An exclusive Manhattan method of equalizing transmission belt ply stresses was developed by R/M engineers especially to eliminate ply separation, rupture and fastener troubles. When Condor Compensated Belt rounds the pulley, every ply is under *uniform* tension . . . every ply pulls its full share of the load. On many drives, Condor Compensated Belt holds fasteners up to 4 times longer than ordinary belt. A selection of driving surfaces is available to meet various machine tension requirements . . . from low-tension to a required degree of slip.

Let an R/M representative show you how the advantages of Condor Compensated Belt can mean more power and longer trouble-free belt life . . . "More Use per Dollar" on your power transmission drives. For endless belts, ask about Condor Whipcord Belts with endless, stretchless cord strength members.

RM 510 F & L

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings • Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Bowling Balls

Send for Your FREE Copy of these New Bulletins

HERE'S THE LATEST INFORMATION ON SOME WF Presses and Rolling Mills

HIGH SPEED BLANKERS—
Cir. No. 915-N-2

Detailed information on 2 sizes of presses for mass production blanking, piercing, shallow drawing and forming. Speed range 300 to 900 rpm. Shows machines from several angles, gives close-ups of design details and pictures typical work samples. Complete specifications included. 8 pages.

TANDEM ROD MILLS—
Cir. No. 729-R

8-pager on mills for high speed reduction of non-ferrous and ferrous rod. Shows various sizes of mills plus work samples and a cross-sectional reduction sequence. Tells how mill can reduce operating costs. Also discusses pay off unit, straighteners, coilers and cooling method. Table gives capacities and other data.

MULTIPLE PLUNGER PILLAR PRESSES—
Cir. No. 754-N-2

8-page illustrated booklet presents latest features in WF multiple station pillar presses. Gives specifications and capacities for six sizes. Shows typical work samples and also covers accessory equipment.

2-HI ROLLING MILLS—
Bul. No. 111-R

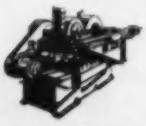
Gives general information on wide variety of 2-Hi mills for cold or hot rolling. Rolls range from 5" dia. to 24" dia. Pictures five different sizes.

INCLINED, SHELL THREAD ROLLING MACHINE—
Cir. No. 833-EL-2

Describes and illustrates automatic inclined shell threader for attachment to eyelet machine or with independent feed. Covers use, construction, operation and drive. Shows work samples and has table of specifications.

WIRE FLATTENING MILLS—
Bul. No. 110-R

Gives information on mills with production speeds approaching 3,000 FPM. Shows various sizes. Rolls range from 4" dia. to 12" dia. Includes data on edgers, pay-offs, winders, drives, coolant system, etc.


BOLT, NUT & SCREW MACHINERY

POWER PRESSES

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WIRE MILL EQUIPMENT

SENDZIMIR MILLS & OTHER SPECIAL MACHINERY

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☐ 729-R ☐ 111-R ☐ 110-R

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FIRST AID TO STEEL IN A PICKLE—

HOUGHTON ACITROL

the pickling inhibitor that won't break down!

For full protection for high or low carbon or alloy steels in your pickling operation PLUS low acid consumption—use ACITROL, the pickling inhibitor that has *more* of the characteristics you want. Here are just a few:

- It resists breakdown at boiling point—longer.
- It requires NO pre-mixing—is readily soluble at all times.
- It is available in foam-forming or non-foaming types.
- It is fully effective at high and low extremes of bath temperatures.

This is only the beginning of the ACITROL list of valuable characteristics—for complete information call your Houghton Man or write for new Acitrol bulletin. E. F. Houghton & Co., 303 West Lehigh Avenue, Philadelphia 33, Penna.

ACITROL... a product of

E. F. HOUGHTON & CO.
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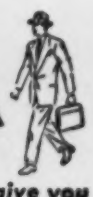
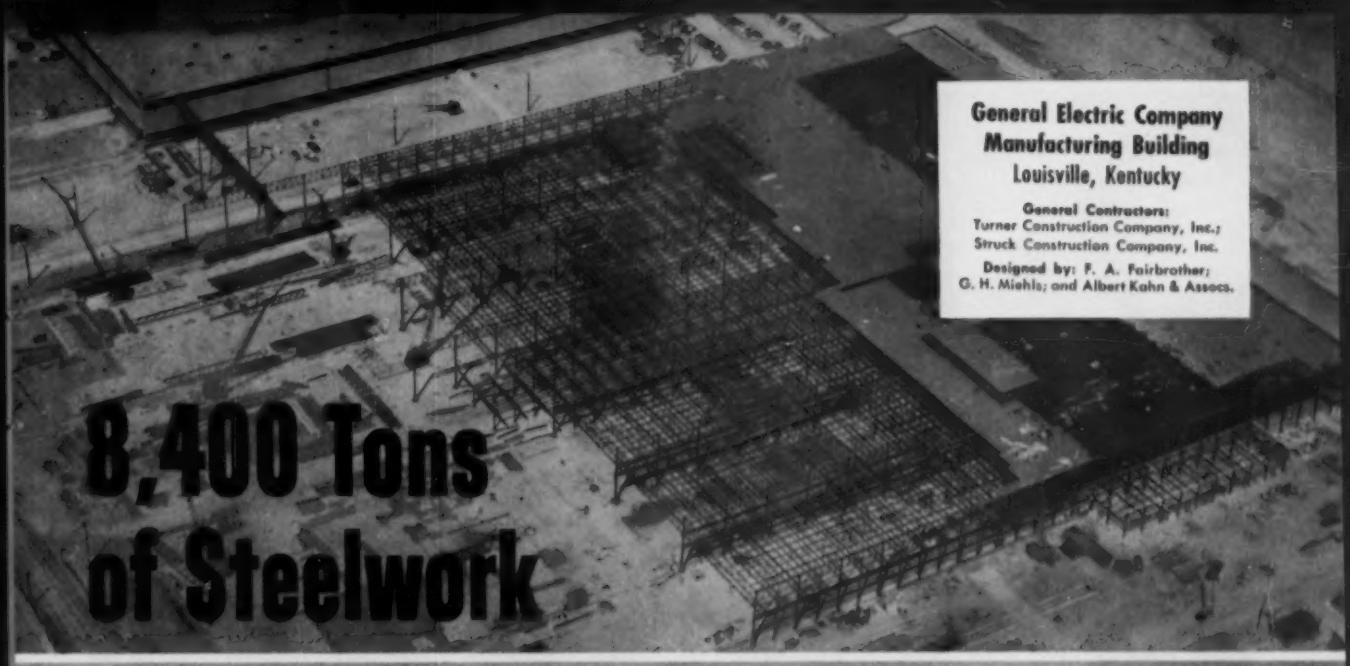


Ready to give you on-the-job service . . .



General Electric Company
Manufacturing Building
Louisville, Kentucky

General Contractors:
Turner Construction Company, Inc.;
Struck Construction Company, Inc.

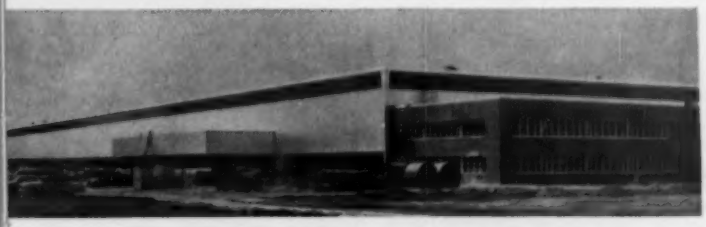
Designed by: F. A. Fairbrother;
G. H. Miehls; and Albert Kahn & Assocs.

8,400 Tons of Steelwork

erected in 3½ months by AMERICAN BRIDGE

This Pipe Trestle is 190′ long x 8′ wide x 44′ high and connects the new manufacturing building with the existing building as shown in left background of the aerial view above.

Below is a corner view showing the completed structure.



● If you need a new mill, factory, warehouse, or office building in a hurry, American Bridge can fabricate and erect your structural steel requirements with dispatch.

As you see from the aerial view above, this new General Electric Company Plant at Louisville, was no small project! This view shows Manufacturing Building No. 5 which is the largest of five huge buildings being constructed at this project for the manufacture of General Electric Company's Major Household Appliances. Big as this building is, AMERICAN BRIDGE erected the steel framework, all 8,400 tons of it, in only three months and sixteen days!

This new manufacturing building is a special high level industrial structure, 700′ wide x 1,000′ long and with a 43′ clear height to the bottom chord of the main trusses. In addition, the building contains two intermediate mezzanine floors over a major portion of the area. Attached alongside the manufacturing building is a paint and oil storage building 36′ wide by 180′ long. AMERICAN BRIDGE also erected a pipe trestle 8′ wide x 190′ long and 44′ high connecting the new manufacturing building with a building previously constructed.

This new General Electric building and the pipe trestle are good examples of American Bridge fabricating and erecting "know-how." You can depend on AMERICAN BRIDGE to handle any type of steel-frame construction with thoroughness and speed . . . any time . . . anywhere. If you would like to know more about the advantages of having AMERICAN BRIDGE fabricate and erect the steelwork for your next building, just contact our nearest office.

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

Contracting Offices in: AMBRIDGE • ATLANTA • BALTIMORE • BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT • ELMIRA • GARY MEMPHIS • MINNEAPOLIS • NEW YORK • PHILADELPHIA • PITTSBURGH • PORTLAND, ORE. • ROANOKE • ST. LOUIS • SAN FRANCISCO • TRENTON UNITED STATES STEEL EXPORT COMPANY, NEW YORK

AMERICAN BRIDGE

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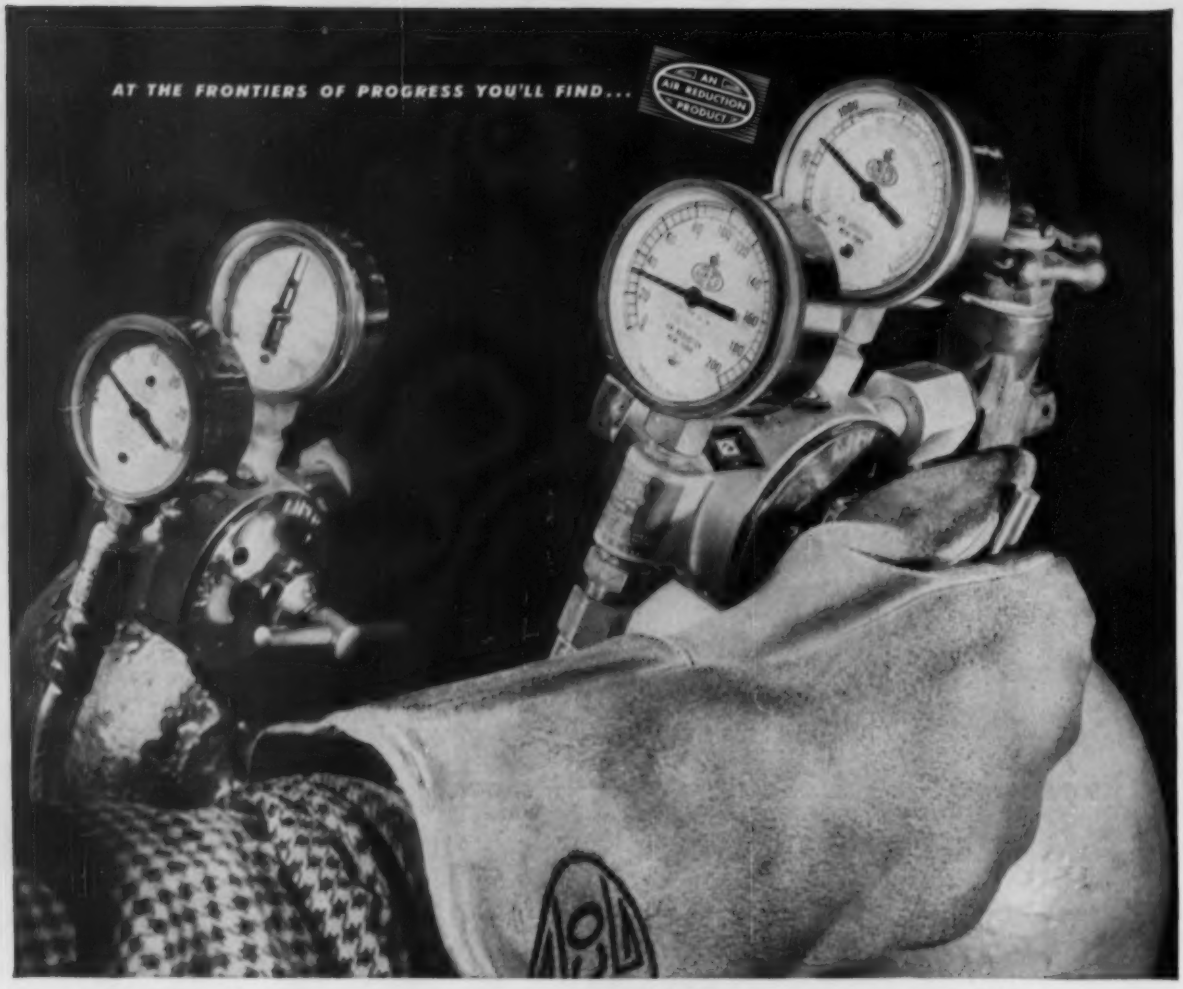
UNITED STATES STEEL



cut production time with AIRCO REGULATORS

that you set... and forget!

Airco two-stage regulators require but one adjustment . . . the first. Once set at the correct operating pressure they deliver a constant, non-fluctuating flow of gas from start to finish of cylinder discharge. Drops in pressure are automatically compensated for. Thus, an operator can devote his full attention and skill to the job at all times – speeding production – reducing costs.

Similarly Airco produces station regulators designed to operate on low-pressure pipe line systems which provide uniform gas pressures wherever required. Here, too, a single setting eliminates the necessity of frequent, time consuming readjustments.

Over two million Airco regulators have been purchased through the years. You'll discover that the inherent advantages of these Airco-engineered products make their initial cost a wise investment for long years of quality, trouble-free service. For detailed information and literature, contact your local Airco Representative, authorized dealer, or write Airco direct.

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Divisions of Air Reduction Company, Incorporated, with offices in most principal cities

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Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** – industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** – carbon dioxide, liquid-solid ("DRY-ICE") • **OHIO** – medical gases and hospital equipment • **NATIONAL CARBIDE** – pipeline acetylene and calcium carbide • **COLTON CHEMICAL COMPANY** – polyvinyl acetates, alcohols and other synthetic resins.

Sciaky patented Three-Phase Welder at Colorcraft, Indianapolis, Indiana.

PRODUCTION COSTS CUT 50%

with One Sciaky Patented Three-Phase Welder

One small, standard Sciaky Three-Phase welder and *one* worker, not skilled, now join more aluminum pitchers and handles for Colorcraft than three workers previously did with screws. Cost per unit is cut in half. Production is increased from 140 to 160 units per hour. Rejects have virtually been eliminated and welds are neater in appearance than screws.

A Sciaky balanced load Three-Phase welder with 85% power factor (compared to 30% for conventional single phase) and a 50% reduction in power demand, is far less expensive to operate than unbalanced load welders. Installation cost is estimated at half that of single phase.

Write today for "Resistance Welding at Work," Vol. 4—No. 3, detailing Colorcraft's story. It's dramatic proof of Sciaky's basic thinking—welders designed for *more useful work* at *lowest operating cost* with *maximum reliability.*

FACTS ABOUT SCIAKY'S PATENTED THREE-PHASE

	SINGLE-PHASE	SCIAKY THREE-PHASE	SAVINGS
TRANSFORMER RATING	250 KVA	100 KVA	150 KVA
WELDING KVA DEMAND	650 KVA	325 KVA	325 KVA
LINE AMPS PER CONDUCTOR 440 V.	1,476 A.	430 A.	1,046 A.
POWER FACTOR	30%	85%	Greatly Improved
INSTALLATION COST—EST.	$10,500	$5,250	$5,250

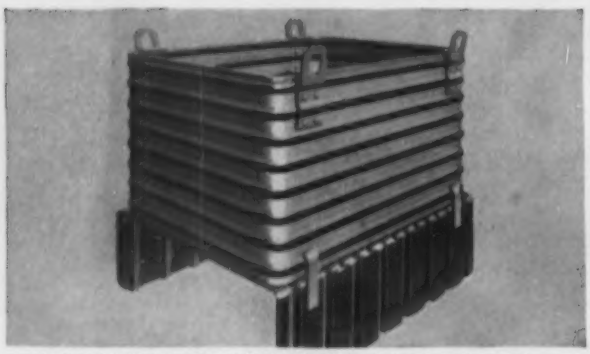
Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY.

Sciaky Bros., Inc., 4923 West 67th Street, Chicago 38, Illinois

Put this usually wasted space to work with

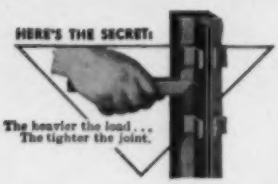
Republic Wedge-Lock long parts storage units



REPUBLIC MATERIALS HANDLING EQUIPMENT is built to meet the requirements of each individual job. Steel boxes, skids and pallets speed production, save floor space, require minimum maintenance, help produce savings. Pictured is the PB-120-CT Box and Skid Unit for use with lift truck. Also fitted with combination tiering and lifting lugs for easy crane handling. Contact your local Republic materials-handling dealer or send coupon for more information.

YOU GET BOTH BEAUTY AND EFFICIENCY when you outfit your office with handsome equipment made by Republic's Berger Division. Smartly styled steel desks feature new eye-comfort tops to reduce eye fatigue. Rigid construction and nylon glides assure smooth non-sticking operation of drawers. Berger's modern Steel Vertical Files, built for a lifetime of service, are striking companion pieces. Send coupon for complete information on the big Berger line.

Exclusive construction permits high stacking of tremendous loads

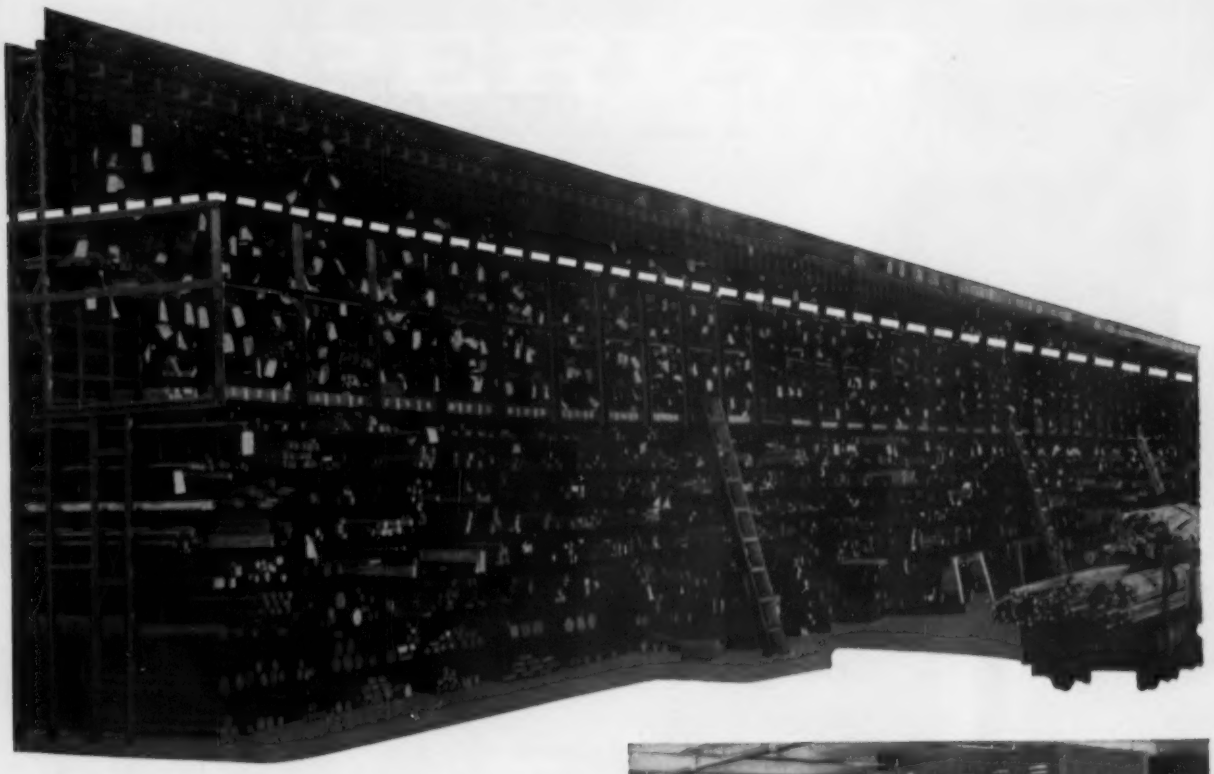


Overhead storage space may be going to waste in your present system. Particularly, where heavy or bulky items are stored.

Wedge-Lock Long Parts Storage Units are specifically designed for high stacking of enormous weights—with no sagging, swaying, or buckling. The reason is the exclusive joint design developed by Republic's Berger Division. As weight increases, joints actually get tighter, increasing the stability and rigidity of the entire assembly. Result: you get maximum loading in a minimum of floor area

REPUBLIC

World's Widest Range of Standard



—plus a more efficient use of overhead space.

Amazing Wedge-Lock increases the efficiency of your entire handling system by providing wide unobstructed aisles, easy access. It is completely flexible, can be assembled quickly and easily to accommodate your own specific storage requirements.

Specify Wedge-Lock for a smooth, fast flow of materials from receiving to shipping. A storage-engineering expert in your nearby Berger Division sales office is always available to help you determine your needs and plan an efficient installation. Call him soon or send coupon for literature and full information on the Wedge-Lock principle.

THE WORLD'S LEADER IN LOCKERS, Republic's Berger Division offers a wide selection of standard steel lockers for every industrial use. Modern design assures full-time protection for personal property. Handles are tamper-proof, cannot be removed. Continuous door strikes along sides prevent insertion of tools for prying. Berger offers a complete locker planning, engineering and installation service. Send coupon for more details.

REPUBLIC STEEL CORPORATION
3104 East 45th Street,
Cleveland 27, Ohio

REPUBLIC STEEL

Please send me complete literature on:

- ☐ Long Parts Storage Units
- ☐ Materials Handling Equipment
- ☐ Lockers
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Steels and Steel Products

The issue of the Iron Age you'll save for the next 100 years...

. . . because The Iron Age's "100 Years of Metalworking" will be the most comprehensive issue of a magazine ever published on metalworking.

In this 100th year commemorative issue you'll find a review of the past, a discussion of the present and—most important—a prediction of the future of every phase of the giant metalworking industry. The list on this page gives you just the bare skeleton of this giant editorial enterprise.

"100 Years of Metalworking" will be a treasured collector's item. And it will serve as a planning guide for future industry expansion and future technological development. The publication date is Mid-June. You'll receive it as part of your regular subscription to The Iron Age.

Watch for "100 Years of Metalworking" — Mid-June, 1955

- Iron Age History
- Atomic Energy
- Casting
- Heat Treating
- Iron and Steel
- Machine Tools
- Materials Handling
- Metal Finishing
- Nonferrous Metals
- Press Work
- Refractories and Ceramics
- Testing, Inspection and Instrumentation
- Welding, Brazing and Joining
- Prices and Production
- Rebuilt Machinery

WANTED

The earliest issues of The Iron Age —first published in 1855 —still in existence in this country.

$500.00 reward will be paid for the issue you discover and submit with the oldest dateline (send photostats or facsimiles—actual issues only if you are a contender). The issue shown at right is one of the earliest copies still on file in The Iron Age's office. Older copies may have similar characteristics.

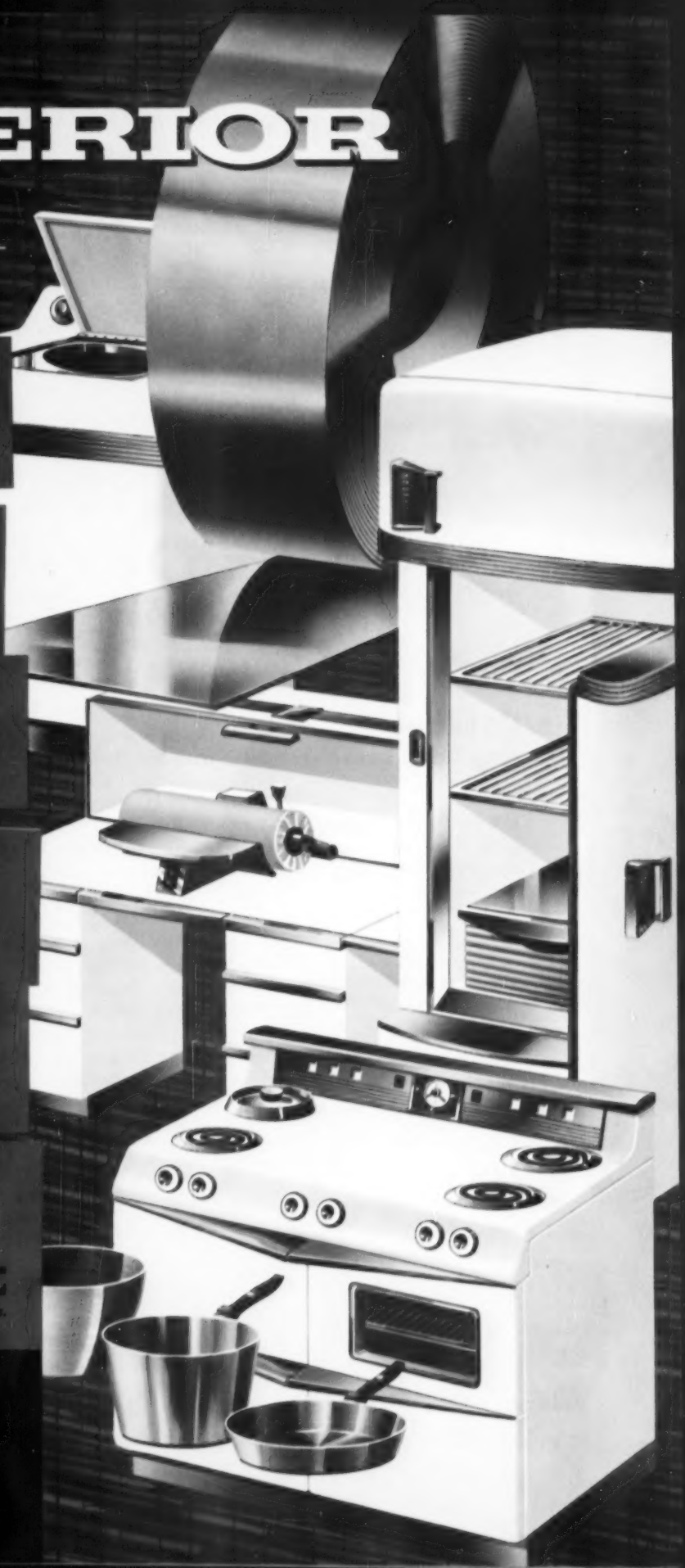
For complete details of this reward write for set of rules governing entries.

the Iron Age A Chilton Publication

Old Issue Information • 100 East 42nd Street, New York 17

SUPERIOR

STAINLESS STRIP STEEL



the beauty-bright trim

that's solid clear through

that cleans with a wipe

that never needs care

that sells in the store

and serves in the home

SUPERIOR Stainless Strip Steel is available in a range of grades, with dimensions, tempers and finishes to meet your requirements. *Write for details.*

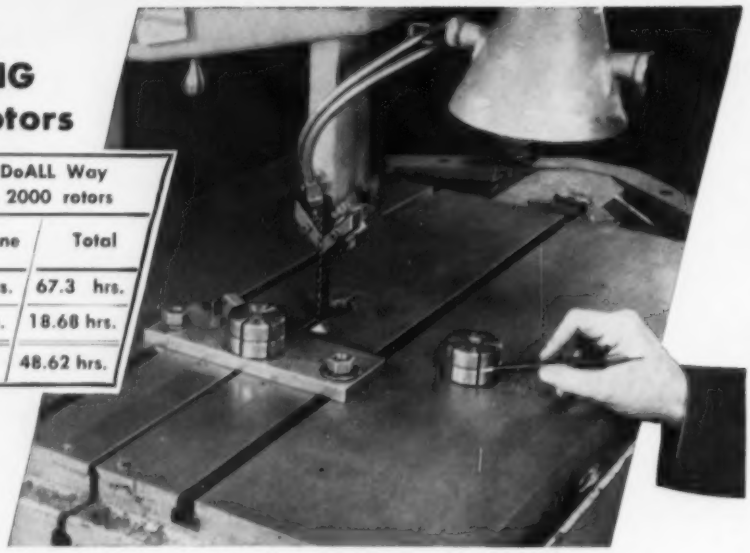
Superior Steel
CORPORATION

CARNEGIE, PENNSYLVANIA

72% TIME SAVING
Cutting Slots in Rotors

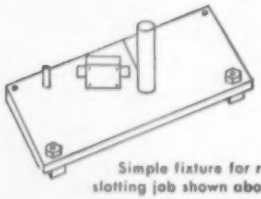
Comparison — Old Way Versus DoALL Way
Machining .100 x .4375 slots in 2000 rotors

	Set-up	Load and Unload	Machine	Total
Old Way	0.7 hr.	19.5 hrs.	47.1 hrs.	67.3 hrs.
DoALL Way	0.08 hr.	7.7 hrs.	10.9 hrs.	18.68 hrs.
Saving	0.62 hr.	11.8 hrs.	36.2 hrs.	48.62 hrs.



You Can Reduce Your Production Costs With This New Machining Concept!

B/M* Bonus... Fixturing Costs Less



Simple fixture for rotor slotting job shown above.

Cutting forces hold work down on the table. Thus, simple back-up bars, clamps or holding fixtures are all that's needed—just something to hold the work in position while the table feeds it automatically into the continuous-cutting band.

*Band Machining.

CONTINUOUS band machining, the most efficient of all machining techniques, is now being widely used on many production line operations in place of slower, more costly methods such as milling, shaping, planing and even turning. Two DoALL developments have opened this new opportunity for cost reduction:

New Contour-matic Band Machines. Hydraulic power-feed tables. Recirculating coolant system and air jet. More power. Greater rigidity. Four sizes—16", 26", 36" and 60" throats.

New Demon High Speed Steel and Band Tools. These band tools will cut up to 6 times faster, last up to 10 times longer than any previous saw bands. They can be driven to red heat temperatures without losing hardness.

Here, then, is a team to cut your costs ⅓ to ½ or more on slotting, splitting, notching, cutting grinding reliefs, contour cutting and many other jobs.

Ask for a free demonstration at your plant. Call your local DoALL Store (see classified directory), or write:

The DoALL Company, Des Plaines, Illinois

DoALL

PB-9

NEW COLOR FILM—"Production Band Machining" now available showing operation of this new machining concept.

Friendly DoALL Stores... (in 40 cities)

Personalized Service...Complete Stocks...Local Delivery

Call Your DoALL Service-Store
DoALL
SAW BLADES
DoALL GRANITE PLATES
Machine Tools • Cutting Tools • Measuring Instruments
Shop Supplies • In Stock
The DoALL Company, Des Plaines, Ill.

EDUCATIONAL STUDY WALL CHARTS
Economic Principles
$1.00 each postpaid
Lower quantity prices.

The Iron Age Newsfront

Electrical Discharge Machining a Hit

Electrical discharge machining is attracting considerable interest among automobile industry master mechanics. Potential applications of the process include carbide form tool sharpening and machining of progressive and extrusion dies in the hardened condition.

Small Parts Inventoried Faster

One progressive metalworking firm is checking small parts inventory by weight using a fork truck with built-in scale. If the experiment is successful, the equipment would greatly reduce inventory expenses by eliminating carrying bins to and from weighing scales.

Jets: Tooling Takes Longer

Military experts say aircraft production build-up to meet defense emergency would require a minimum of two years. Performance requirements of present day planes mean longer tooling up periods. Korean experience proved to both Air Force and industry that defense production cannot be resurrected overnight.

Improved Nozzles Aid Steel Pouring

Steel pouring operations run more smoothly with an improved ceramic nozzle. A wood preserving process has been adapted to permit pressure impregnation of ceramic nozzles with a special, heavy tar. Nozzles withstand sudden application of high heat without spalling or breaking, reduce chills during pouring, provide better stopper seat, it is claimed.

Wastes Turned to Tidy Profit

A new process in which ammonia, hydrogen sulphide and hydrogen cyanide are washed from coke oven gas with the waste pickle liquor from steel plants has awakened plenty of interest. Ammonium sulphate, ferrous hydroxide and iron cyanides are recovered in marketable form. Sulphur or sulphuric acid may be recovered with an additional processing step.

Bill Aims at Phantom Freight Rates

Phantom freight rates are targets of HR 528 recently introduced in Congress. It would brand as unfair any excessive amounts charged by a vehicle manufacturer as freight costs to the buyer. Identical bill offered last year didn't get far.

Maintenance on the Atomic Level

Preventive maintenance is a must in operation of atomic reactors. When something does "go," there's trouble. A recent report describes the complete dismantling of one reactor, and the dismantling and repair of another. Unusual safety precautions successfully protected personnel from lethal radioactivity.

Power Industry Tackles Problem

Extensive use of aluminum conductors in electrical power distribution has brought some problems. Failures of connectors, splices, and taps, particularly where aluminum-copper junctions are made, have been caused chiefly by corrosion and mechanical problems in making connections. A systematic program of attack on these problems is expected to bear results in the near future.

Steelmill Safety: Continued Improvement

Constant emphasis on safer equipment and better methods of safety education have paid off in continued improvement of safety records in steel mills. Despite high level operations, lost-time accidents, measured by any scale, keep going downward.

UAW, Industry, and GAW

Labor specialists in the auto industry are hot under the collar over the frequently repeated conclusion that the UAW will win a token victory in the guaranteed annual wage drive. They state privately that it isn't true, but that repetition makes bargaining that much more difficult.

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SM-13

Foundries: Reflect Thriving Economy

As suppliers of basic industries, foundries are prospering from good business conditions . . . Industry gains are as much as 35 pct over last fall . . . Competition cuts into profits—*Staff Report.*

◆ FOUNDRIES are riding the crest of a business wave that began early last fall and appears to be continuing well through the first half of this year.

Reflecting the general business upturn, particularly in the heavy and durable goods fields they supply, the nation's foundries are pouring enough metal to assure a profitable first half and overtime checks for many of their workers.

"It is characteristic of the foundry industry that its rates of production vary with general economic conditions," pointed out Cleve H. Pomeroy, president of National Malleable and Steel Castings Co.

"It is felt that the bottom of the current cycle was reached last year and that now the industry is definitely on the up-grade as its major customers pick up momentum," he said, at the same time predicting "an encouraging improvement in sales and profits for the year."

Automotive Big Factor

In several of the nation's industrial centers, the strong automotive production was credited with the increasing foundry business. It is significant that in Detroit, Cleveland and Chicago, all automotive centers, as well as Pittsburgh and the West Coast, the upswing in business began last fall with the introduction of the 1956 lines, which are still being produced at record breaking rates.

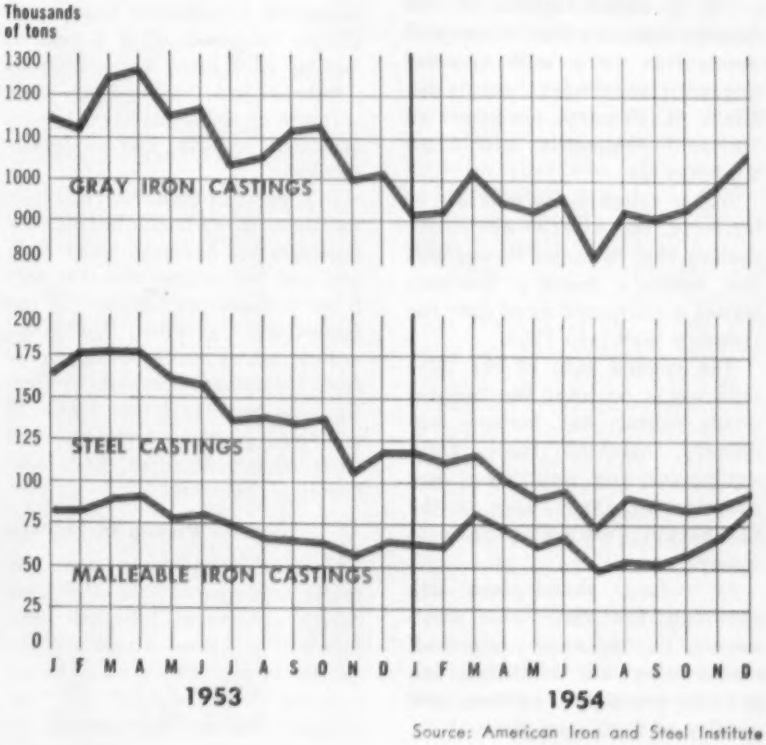
At the same time, the advancing volume comes from a healthy cross section of industry that shares about equally in creating the foundry demand. Factory machinery, machine tools, earth moving equipment, farm equipment and appliance, railroad equipment, industrial engines, building equipment, pumps and pumping equipment, heat treating equipment, oil field material and printing material are active purchasers of castings.

In the major trade association town of Cleveland, three national foundry groups agreed business has taken a marked upswing from last year and prospects for the first half are promising.

For gray iron foundries, production has gone up almost 10 pct since December and 35 pct over last September. Malleable foundry backlogs are now in excess of 100,000 tons or about 40 days, compared to 85,000 tons or 30 days at the end of the year. In special cases, backlogs are out to 60 days and two shifts are running.

Steel foundry employees showed the highest gross hourly earning average in history during the last

Castings Shipments



Source: American Iron and Steel Institute

quarter of 1954 and prospects for the first quarter are even better. Last quarter wages averaged $2.02 per hour exclusive of fringe benefits while the previous high was $1.98.

Production of steel foundries in January was 45.6 pct of maximum demand, which is comparable to capacity. This compares with 33.2 pct last July, low point for the year.

Major problem of steel foundries at the moment is that while shipments are good, hot competition has kept profit margins below normal. Thus, in the same quarter when workers racked up record paychecks, the management profit was under 5 pct before taxes. Normal is about 10 pct. One saving factor is that mechanization dropped man hours per ton in the last half from 96 to 92.5.

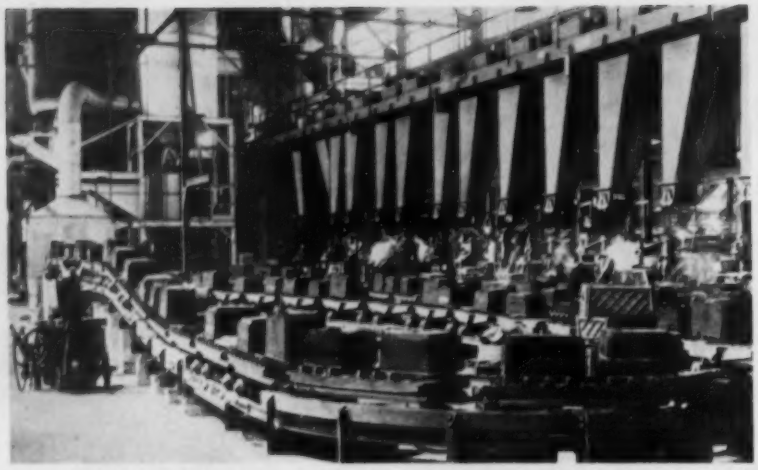
What's Behind Foundry Pickup?

"It is characteristic of the foundry industry that its rates of production vary with general economic conditions," points out Cleve H. Pomery, president of National Malleable and Steel Castings Co.

As a reliable barometer of business, the current optimistic feeling that is found throughout the nation's foundry business means a continued good rate for industry well into 1955.

The record rate of the auto industry is perhaps the biggest single factor, but factory machinery, machine tools, farm equipment and appliances are contributing their share to the prosperous foundry business today.

In return, foundrymen are spending for their own businesses, buying new equipment, modernizing old facilities, improving working conditions and quality of their own product.



ASSEMBLY LINE conveyer used by Midwestern foundry to transport molds from furnace at left. Trend in foundries is toward modernization.

Along this line, improvement and modernization of foundry equipment is starting to roll. Hot competition within the industry as well as new competition for business from forging and extrusion has forced foundries to improve methods and quality.

National Malleable, as an example, spent $2.8 million on improvement last year. A sales executive of a foundry equipment supplier reported in Detroit that foundries are making heavy purchases this year, after a year of buying doldrums. Many foundry purchases are for handling large volumes of small castings, aiming at speed, quality, and automatic handling.

In Cleveland foundries, a steady increase in railroad orders has strengthened business since August, and indications are that this trend will continue at least in the immediate future. Industrial orders, which suffered last year from customer inventory reductions as well as lower levels of business from automotive and farm equipment fields, have also begun to increase.

Pickup in Chicago

Chicago foundrymen are virtually unanimous that the slow fourth quarter of 1954 has been followed by better things, and the consensus of 1955 operations ranging from "steady" to "improved." March is expected to climb appreciably over the February level. First quarter will exceed the same period of 1954 and 1955 will be way ahead of 1954.

Order backlogs in Chicago aren't extended generally, but with many small jobbers still working a week ahead. On the other hand, a 5-day work week is common, even though pouring may be only three times weekly. Only about half of the small jobbing gray iron foundries are pouring over four days a week.

Nor are raw material inventories extended heavily. As the work load has increased, foundrymen have readjusted their monthly intake of pig upwards to meet the higher castings shipping rate, but have not extended their ordering or put in any pig stocks over and above normal. Deliveries of pig are easy and few expect any appreciable tightening.

Centralizing Hurts Jobbers

On the basis of pig iron sales, the first quarter will easily beat the first quarter of 1954. Since there has been considerable centralizing of casting operations in the Midwest in the past two years, jobbing foundries have not shared as much of the advance as total increase would indicate. Out-of-area competition is also affecting Chicago foundries. Castings from as far away as Alabama are still affecting prices.

The Pittsburgh situation is

somewhat less optimistic than elsewhere, although most sources report a substantial business upswing. Some second half pessimism is also heard from this section, most of it a reflection of the midsummer drop in 1954.

Alloy and steel foundries show slightly better improvement than iron foundries. This improvement stems primarily from strong auto production and increasing demand from steel mills. Most Pittsburgh foundries logically related their own business condition to the business they supply. Actually, much of the steel business is just getting under way.

One Pittsburgh foundry, a large producer of slag pots, charging boxes, etc., for the steel mills, reports business up 35 pct over the same period in 1954 with orders coming in nicely. But another in the same city is working at only about 35 pct of capacity.

There is no particular backlog of orders in this area. While orders have picked up during January and February, they have not improved to the extent of more than a two or three weeks backlog.

Detroit foundries are basking in the reflection of the record auto production rates and are encouraged about second half prospects by the optimistic predictions of auto industry leaders. Many foundries that a year ago were down to three or four day weeks are now on overtime. Gray iron foundries are showing the most solid gains, non-ferrous foundries are somewhat behind.

There's a Soft Spot

Only gloomy spot in the foundry picture is among those making castings for automotive dies. Because of the very few significant model changes coming up in 1956, the market for large castings for dies is not good. In addition, there is less of a market for large castings of any kind than for small in size but large in volume pieces. For this reason, some Detroit foundries are investing in equipment to handle large volumes of small castings with more mechanical or automatic handling equipment. Inquiries on foundry automation are frequent, but actual investments in automation are few, except for the large automotive foundries.

West Coast Cheerful

The general cheerful feeling extends all the way to the West Coast where foundries show substantial pickups and lengthened backlogs.

"We are going on two shifts for the first time in a year," one foundry owner in central California declared. "We were on one shift all last year. There are indications that enough momentum will be generated to last the rest of the year."

Other executives report backlogs double those of a year ago. Exceptions to this general report were few. Some believe that the profit picture is not what it should be despite the increase in volume. Costs have advanced while competition has prevented prices from advancing proportionately.

Turbines Help

In southern California, about 80 pct of foundries are operating on a backlog of two weeks, good for this area. Behind the new business are increasing activities in agricultural irrigation and home construction. Turbine pump manufacturers are in the middle of their seasonal pickup, which should last into May. Captive foundries are overloaded and spilling turbine pump business into the job shops. Home construction has created a solid demand for soil pipe and fittings.

In most areas the excellent and still improving picture has advanced prices of cast scrap, but not to any alarming extent. Pig is plentiful although some founders don't like to pay the price. Materials do not present a major problem.

All in all, founders across the nation are prosperous. They feel profits could be fatter, but in contrast to conditions six months ago, the outlook is bright.

Steel: What Mills Shipped in January

As Reported to the American Iron and Steel Institute

JANUARY 1955

STEEL PRODUCTS	Carbon	Alloy	Stainless	Total	Percent of Total Shipments
Ingots	14,578	13,749	1,949	30,276	0.6
Blooms, slabs, billets, tube rounds, sheet bars, etc.	134,035	37,471	1,122	172,628	2.9
Skelp	6,011	...	...	6,011	0.1
Wire rods	82,272	2,024	536	84,832	1.4
Structural shapes (heavy)	332,280	3,806	9	336,095	5.6
Steel piling	21,480	...	...	21,480	0.4
Plates	416,909	20,480	1,289	438,718	7.3
Rails—standard (over 60 lbs.)	92,439	...	...	92,439	1.5
Rails—all other	4,679	...	...	4,679	0.1
Joint bars	3,283	...	...	3,283	....
Tie plates	15,626	...	...	15,626	0.3
Track spikes	4,965	...	...	4,965	0.1
Wheels (rolled & forged)	21,641	164	...	21,805	0.4
Axles	7,356	2	...	7,358	0.1
Bars—hot rolled (incl. light shapes)	462,142	157,961	3,063	623,166	10.4
Bars—reinforcing	115,750	...	...	115,750	1.9
Bars—cold finished	110,021	22,000	3,884	135,905	2.3
Tool steel	1,051	6,771	...	7,822	0.1
Standard pipe	194,061	121	...	194,182	3.2
Oil country goods	148,914	29,996	...	178,910	3.0
Line pipe	119,377	...	...	119,377	2.0
Mechanical tubing	48,130	17,881	201	66,222	1.1
Pressure tubing	15,889	2,149	958	18,996	0.3
Wire—drawn	211,193	3,410	2,315	216,918	3.6
Wire—nails & staples	49,480	...	...	49,480	0.8
Wire—barbed & twisted	10,856	...	...	10,856	0.2
Wire—woven wire fence	29,091	...	...	29,091	0.5
Wire—bale ties	2,291	...	...	2,291	....
Black plate	62,373	...	...	62,373	1.0
Tin & terne plate—hot dipped	82,674	...	...	82,674	1.4
Tin plate—electrolytic	335,682	...	...	335,682	5.6
Sheets—hot rolled	700,063	31,376	2,251	733,690	12.2
Sheets—cold rolled	1,174,705	3,256	9,143	1,187,104	19.8
Sheets—galvanized	210,795	306	...	211,101	3.5
Sheets—all other coated	20,671	...	...	20,671	0.3
Sheets—enameling	20,066	...	...	20,066	0.3
Electrical sheets & strip	9,998	46,813	...	56,811	1.0
Strip—hot rolled	156,727	1,904	457	159,088	2.6
Strip—cold rolled	110,261	1,085	21,282	132,628	2.2
TOTAL SHIPMENTS (1955)	5,559,074	402,745	48,138	6,009,958	100.0
TOTAL—PRIOR YEAR (1954)	5,361,531	327,745	38,324	5,727,600	....

LABOR

GAW: Auto Industry Takes Offensive

Total wages and hours, plus state unemployment programs, smooth rough spots . . . Automation gets public support . . . Automakers stress gains as 5-year labor pact ends—By *R. D. Raddant.*

◆ AUTOMAKERS are slowly taking positions to launch their own offensive or defensive maneuvers against the guaranteed annual wage drive of the United Auto Workers.

Actual tactics that will be employed by General Motors, Ford, Chrysler and others are as closely guarded as any military secret. But some recent developments have indicated what the general plan may be, if not its precise strategy.

Meanwhile, the twentieth and last period of adjustment in the historical 5-year pacts with the UAW occurred last week. Primarily because there was not enough change in the index to justify a wage revision, this labor milestone, important to about a million auto workers passed almost unnoticed. GM's contract expires May 29, others at varying periods thereafter.

In getting ready for the bargaining, which can start 60 days in advance of contract expiration, the auto industry has indicated several points it will push to the fullest extent.

Stress State Programs

It will stress that through state unemployment compensation programs, health security measures and pensions, the auto industry is already contributing to a guaranteed annual income. (The UAW, incidentally, now uses the term guaranteed annual employment.)

It will exploit to the fullest the fat overtime checks auto workers draw in boom periods, contrasting them to overtime waivers in other guaranteed annual wage plans now in effect.

It is already staging a strong counter offensive stressing the constructive and far reaching benefits of automation, which the UAW has now tagged as the prime motivating factor behind GAW demands. In this field the auto industry has found willing allies in every industrial segment.

Automation Popular

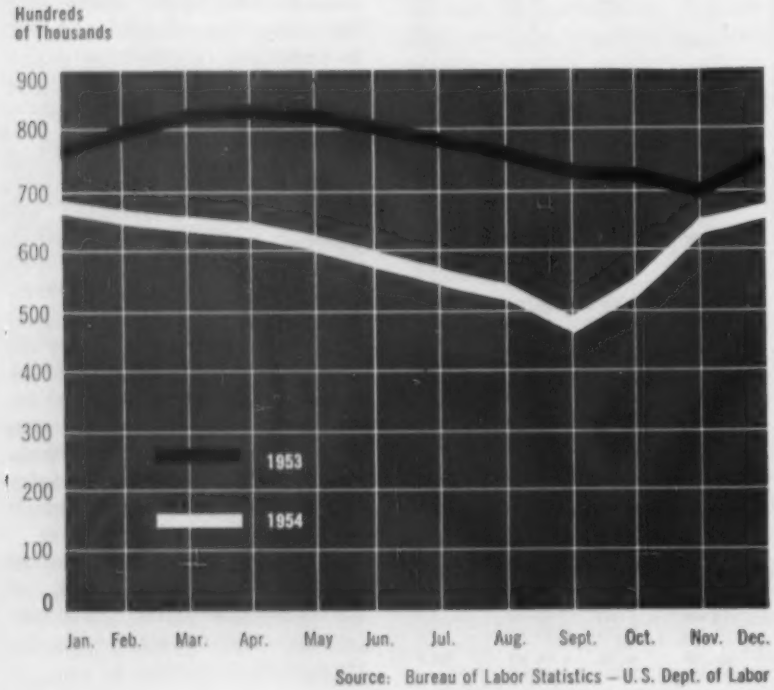
In fact, it is generally believed that industry has been much more successful in selling automation publicly than has labor in building it up as a monster that could destroy its own creator.

Last week GM took the offensive on just these points in a series of official statements and releases. It pointed to the comparative security and welfare of auto workers in general and GM workers in particular. It also traced the progress of auto workers under the 5-year pact that the UAW now says "fell somewhat short."

In the 5-year period, the cost-of-living allowance was increased in 11 quarterly periods, decreased in six quarters, and remained the same in three periods. Hourly earnings increased 44 cents since June 1, 1950, of which 22¢ represented the net increase in cost-of-living allowance, the remainder from the annual improvement factor. Skilled workers received 10¢ per hour more than unskilled in increases over the same period.

During that time, hourly rated GM employees averaged 40.7 hours per week without strikes, the average GM worker losing only 33

Total Employment—Auto Production Workers



Source: Bureau of Labor Statistics – U. S. Dept. of Labor

minutes in five years because of work stoppages.

Under the GM pension plan negotiated in 1950, 12,700 hourly rated employees retired and were paid $11,800,000 by GM in pension benefits. Also, $168 million was paid in sickness, accident, death, hospital and surgical benefits in a program under which the company and employees split the cost.

Without identifying the GAW as such, a joint statement by President Harlow H. Curtice and Chairman Alfred P. Sloan, Jr. indicated GM's final stand would be firmly in opposition, scarcely any surprise to either side.

Industry Pays

"Public discussion of various types of so-called wage guarantee plans tended to obscure progress already made in stabilizing employment, and also have tended to divert attention from the fact that there are already in existence employer-financed unemployment compensation systems regulated and administered by state governments," they stated.

GM alone contributed more than $263 million in 1954 to these funds. Except for minor provisions now in effect in two states, these guarantees are paid entirely by employers with neither general tax receipts or contributions of employees going towards payment of unemployment benefits.

Ask Revision

In Michigan, for example, unemployment compensation for a laid-off worker amounts to a high of $30 a week for a maximum of 26 weeks. The UAW is urging the legislature to boost this amount to 65 pct of a worker's gross wages, but not to exceed two-thirds of the state's average weekly wage. In addition, the UAW wants the maximum weeks' coverage boosted to a high of 39 weeks. This is pretty much on the way to a guaranteed annual income, without even going to the bargaining table. Chances are slight of such a proposal ever passing or becoming the rule, but it shows what may be in the wind.

MANUFACTURING

WIRE ROPE: A New Super Grade

Two companies already in production . . . Others may join the parade . . . 15 pct greater strength . . . New material will find specialty applications in construction, oil.

HIGH STRENGTH wire rope is being used in the launching of Navy jets by high-speed steam catapults. Cable launching assembly is beneath plane.

◆ TO KEEP pace with growing market needs, two wire rope producers are marketing a premium grade rope of 15 pct greater strength than best standard type heretofore produced. Other makers are considering a similar move.

American Chain and Cable Co. and John A. Roebling's Sons are the first to produce the new rope, which will have specialty applications in construction, oil well drilling, logging and other heavy operations. Selling price is about 10 pct higher than so-called improved plow steel.

Use New Wire

ACC is concentrating on such applications as rotary drilling lines, shovel hoist ropes and similar specialties. Diameter range is ½ to 2-in. Roebling is selling the new rope in diameters from ¼ to 3½-in. for a large number of rough-handling operations. Both producers are using steel cores.

Improved rope quality is credited mainly to special new steel wires having high tensile strength with good working characteristics. Big problem has been to keep wire pliant and tough as strength is increased. This job has been licked with something to spare; both lines offer added life along with other qualities.

Means Smaller Ropes

The move to stronger wire rope has been influenced by market needs. Added wire strength is considered a must in keeping equipment bulk within reasonable limits. For example, the trend toward deeper holes in oil well drilling was threatening to take mobile rigs out of the transient class. Hoisting drill pipe out of a 25,000-ft well calls for mammoth size conventional wire rope. Drums to wind the rope had just about reached the maximum workable size.

Fifteen percent greater rope strength means the same load can be handled by smaller rope. Deeper drilling is an immediate and obvious benefit of the size reduction.

NICKEL: Supply Remains Tight

But government plans no controls . . . Defense officials fear some users abusing military and atomic energy properties . . . Industrial demand in 1955 will exceed 1954 consumption—By *N. R. Regeimbal.*

◆ NICKEL, the world's most critical material since the beginning of the Korean war, will remain in short supply for years to come, but government has no plans to reimpose controls.

Government planners, however, are becoming increasingly worried over the nickel situation. Spokesmen point out that the extreme shortness of supply for civilian uses is limiting expansion of nickel consuming industries and causing many to seek substitutes. They fear that when the government fills its stockpile, or defense requirements slip even further, there will be an oversupply.

Defense officials are also alarmed about a million-pound a month jump in nickel "use" this year over estimates, which they fear indicates that some users are "abusing" military and atomic energy priority ratings to lay in large plant supplies. But the Commerce Department says that while a jump has occurred, it is not dangerous and so far officials there are just keeping an eye on purchases.

Seriousness of the nickel picture, both from shortages now and possible oversupply caused by a lack of markets at some future date is reflected in a special government survey of the nickel situation disclosed to THE IRON AGE.

Report Conclusions

The report, conducted by the Commerce Department, Office of Defense Mobilization, and Defense Department, contains a dozen conclusions as a result of a six-month study. Among them are:

(1) Industrial demands for nickel for non-defense business for 1955 will exceed 1954 consumption rates. Increases in consumption for electroplating, stainless steel, high temperature and electrical resistance alloys will increase, while demands for low alloy steel and non-ferrous uses will drop, reflecting a general downturn in defense requirements.

(2) Permanent damage to nickel consuming industries has resulted from the psychology of scarcity of nickel supplies, discouraging potential new businesses requiring nickel, and retarding the growth of existing nickel-consuming industries.

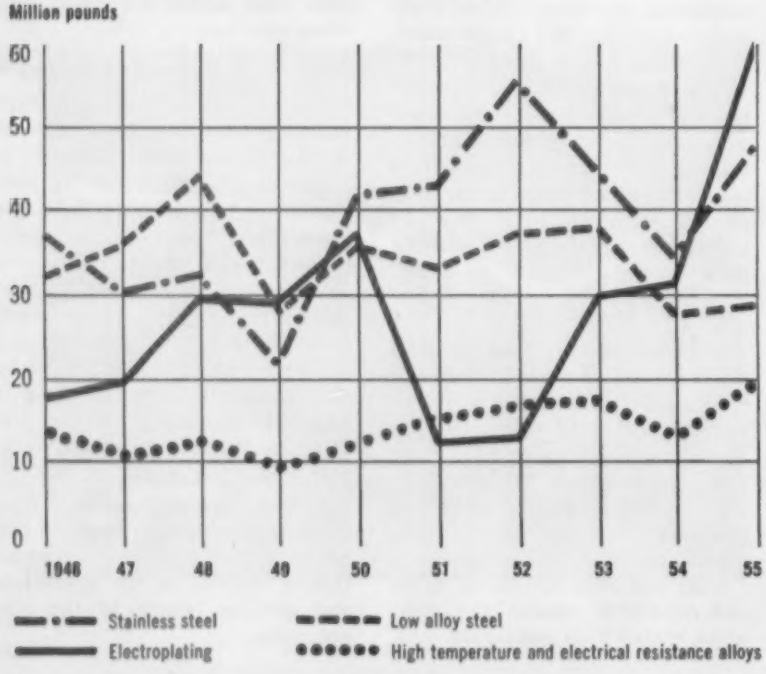
(3) Essential facilities, skills and pipe lines required to sustain a growing economy are sacrificed because of the insecurity regarding nickel supply. The nation's mobilization base insofar as nickel industries are concerned is being maintained at an inordinately low level as a result of limitations on nickel.

(4) Government's divergent policy with respect to nickel and competing metals such as copper and aluminum is adversely affecting nickel-consuming industries.

(5) Encouragement of nickel consuming industries is essential, and it is essential for the government to establish and announce an increasing supply of nickel available to industry over the next several years.

The report sets at 200 million lb the amount of nickel expected to be available for civilian and defense industries in 1955. Nickel

Trends in Nickel Use—1946-55



consumption in the U. S. ranged from 160 million lb in 1946 to about 136.5 million lb in 1949. During Korea, consumption was about 211 million lb.

Although stockpiling of nickel in 1954 increased, driving total industrial supplies down to about 184 million lb, reductions in military requirements kept supplies available for civilian uses above the '53 level.

Needs are estimated for both defense and civilian uses at from 225 million lb to 230 million lb in 1955.

Estimated Requirements

Government planners estimate that minimum growth of the nickel industries to keep pace with technological advances and economic expansion would require 240 million lb for all uses by 1960, and are aiming at expansions which would permit civilian industries to be assured of that tonnage with additional supplies for defense uses.

Nickel supplies in consumers' plants hit their highest point in 1948, the report shows, when it reached 21.3 million lb. Stocks dropped steadily through 1951, and began to climb again in 1952, hitting another high point of 20.2 million lb last July, before beginning to taper off last fall. There are indications that stocks may be on the rise again.

Total supply of world nickel available to the U. S. will be about 295 million or 300 million lb in 1955, the report states. About 200 million lb will go for civilian and defense uses, and the remainder will go to the stockpile.

Still Not Enough

Industry as well as government urge stockpile acquisition this year be modified downward slightly, but in no case less than the 1954 rate. The report shows that the U. S. supply in 1954 was about 275 million lb, while total industry uses were 184 million lb. If the stockpile take, apparently set at about 95 million lb for 1955 were reduced to the 91 million lb taken in 1954, it would make available only another 4 million lb.

Consumption of nickel in industry in 1955, the report says, will be moderately up in several categories. Stainless steel requirements should rise from an estimated 34.9 million lb in 1954 to between 45 and 50 million lb this year to produce 300,000 finished tons of chrome nickel stainless steel and more than 500,000 ingot tons of chrome nickel alloy steel.

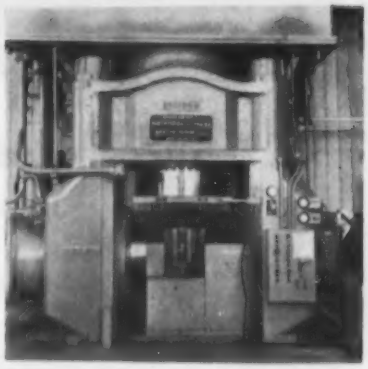
Nickel needed for low alloy steel should drop to 26.8 million lb this year, about the same as 1954 but 11.1 million lb below 1953. Nickel needed for non-ferrous uses should also drop to about 55 million lb, compared to 60.1 million lb in 1954 and 64 million lb in 1952. These drops reflect decreasing defense requirements, the report says.

Titanium:

Mallory-Sharon completes new titanium melt shop at Niles

Mallory-Sharon Titanium Corp., Niles, O., has completed a new melting plant that increases ingot capacity to 3 million lb per year.

The new plant consists of four double-melting furnaces, used for both first and second stage melting of titanium from sponge to ingot. They combine features of the so-called "Method S," consumable electrode-double melting, and new vacuum melting techniques.



A 3000-TON hydraulic press is used at new titanium melt shop of Mallory-Sharon to compress sponge.

First step in converting sponge into ingot is compression of the sponge into long electrodes. The electrode is then fed into a vacuum melting furnace, where it is arc melted, forming a solid ingot. This "first-stage" ingot is then used as an electrode in a second melting operation, yielding a final ingot weighing approximately one ton, the company says.

Mallory-Sharon claims their method produces a more homogeneous ingot, provides close control of alloying elements, and increases the yield from sponge to ingot. The company points out that scrap loss in melting is about 40 pct on bar stock, and 50 pct on sheet.

The new plant also includes a 3000-ton hydraulic press already installed and a 1500-ton press that will be moved from the P. R. Mallory Co. in Indianapolis, plus a blending room and storage room.

"Always, Johnson, a steel reinforced concrete column has the right-of-way."

Power Contracts Let

Ontario Hydro Electric Power Commission has awarded contract for 16 turbines to serve the St. Lawrence power project to English Electric Co., Toronto. Amount of the award is $7.5 million.

The Commission has also awarded contract for more than $3.5 million to Canadian Westinghouse Co. Contract calls for six 55,000 hp generator units to serve the Niagara Falls project. Canada's half of the power project will provide more than 1 million hp with turbine delivery beginning March, 1956.

Electron cs: Industry's Growing Boy

New records in sight for 1955 . . . Industry uses outstrip radio and TV . . . Research pays off in uncovering new uses and markets . . . Automation takes a big share . . . Sales approach steel—*By K. W. Bennett.*

◆ FROM A RECORD $8.8 billion gross in 1954, the electronics industry will climb to $10 billion in 1955. With radio and TV representing a shrinking percentage of the total electronics sales, the industry will be carried upward by already advancing industrial and governmental purchases to another peak year.

Like an iceberg, the largest part of electronics sales aren't apparent to the public view. The radio and television sets that respectively wake Mr. Consumer in the morning and ease his working day tensions in the evening represented in 1954 roughly about one eighth of total electronic equipment sales. It is pretty positive at this point that the fraction will sink to about one tenth in 1955.

Not because television and radio manufacturers are skidding. Opening 1955 sales have been good. The forecast for this year runs about 6.5 to 6.0 television sets, about 10 million to 10.7 million home and car radios. For television sets the figure is about equal to 1954 sales, which were good and 10 pct ahead of 1953, the previous record year. At least some manufacturers are finding radio-TV sales running ahead of last year's sales in the same period, and one is planning to advance his own sales by 35-40 pct at the expense of competitors. There's no gloom and individual sales estimates often run ahead of the industry forecast, but the TV total isn't expected to advance with the rest of the electronics industry.

If there is any gloom present in electronics consumer items it's color TV. The enthusiasts who were predicting 300,000 set sales in 1955 are beginning to droop.

The bright side is sales of electronic equipment generally. With the government still conceded to be the biggest buyer, industrial purchasing has moved into number two position, buying instruments, communications equipment, electronic controls, computers, mobile and inter-plant and intra-plant radio and television equipment, sonar, industrial radar, and microwave equipment.

Thus far this is the groundwork. Advancing automation, as well as wider application of available electronic equipment, brought the forecast from Allen B. DuMont, head of Dumont laboratories, that in 10 years the figure will have reached a $25 billion annual total. At present, electronics leaders will point out that basic electronics research has outstripped applications. It is the payoff for an industry that's put at least 6.4 pct of its sales dollars into research, and probably more. The problem now: to acquaint the potential user with what electronic equipment can really do.

GUIDED by electronics, a tractor train threads its way through a plant without an operator.

This is not a coming boom. It's a solid business advance that is already on the scene. Allied Radio at Chicago is probably the United States' largest electronic parts distributor. President A. D. Davis told THE IRON AGE last week that sales in the first two months of 1955 have exceeded the same period 1954 by 15 pct, and the firm confidently expects a duplicate advance for total 1955 over 1954. In short, every year has exceeded the previous year by a comfortable margin, including 1955, and hi-fi fans and industrial accounts are leading the surge.

Make Sales Gain

Electronics parts distributors generally duplicate the Allied Radio case. In 1953 electronic parts distributors chalked up a 25 pct sales advance over the year previous to gross $450.4 million. In the first nine months of 1954 they were already $15 million ahead of 1953.

Long range or short range, electronics is climbing and at an accelerating pace. It's impossible to get a complete picture of the raw materials consumed by this World War II baby that's now grown into a major industry (electronics men claim 8.8 billion sales in '54 as compared with 10 billions for steel and 11 billions for autos), but to the metalworking industries it means more sales of sheet steel, soldering and welding equipment, copper, zinc, stampings, forgings, castings, wire, forming dies, fasteners, light press equipment, transistors, capacitors, materials handling equipment. The youngster is adult but he hasn't stopped growing.

Investment:

Push greater U. S. Investment in South American industry.

The first private Inter-American Investment Conference, aimed at stimulating a flow of U. S. capital into South American industry, has already produced concrete results.

At the close of the New Orleans meeting, R. S. Hecht, Louisiana financier, and a founder of International House, announced creation of a multi-million-dollar trust fund for the purpose of funneling U. S. investment money into promising S. A. projects.

The initial capital, from $10 to $15 million, will be made available as soon as preliminary details are worked out and suitable management retained for the trust.

Mr. Hecht said the New Orleans organization will administer the trust fund "for the benefit of participants on both sides of the border and will act as clearing house for all future information and suggestions."

Ease Defense Loss

The conference focused attention on the importance of Latin American dollar prosperity on both sides of the border. Herbert Levy, president of the Banco do America, Sao Paulo, Brazil, stressed the need for continued Latin American purchasing power.

He declared that South American purchasing dollars are needed by the U. S. in times of peace to ease the effects of loss of defense spending on the economy.

It is impossible to speak in terms of currency stability for Latin America as long as it is dependent on the proceeds of raw materials salable at unpredictable prices in the world market, he added.

Need to Diversify

His point is that the U. S. should support with investment money projects that would bring about expansion and diversification of Latin economies, despite no immediate return.

Representatives of the Latin American countries were concerned over what might be called an unfavorable balance of investment.

MARKETING

SHEETS: New Electrical Producer

Crucible, Allis Chalmers form new company . . . Will be in production in April . . . Capacity will be 1500 tons per month . . . Electrical sheet market booming.

◆ ANOTHER producer-consumer combination is about to enter the electrical sheet field.

Crucible Steel Co. of America and Allis-Chalmers Manufacturing Co. have pooled resources and know-how in the construction of a $4.5 million plant at Midland, Pa., for production of grain oriented silicon sheets.

A newly-created company, Silicon Steels, Inc., has begun production on an experimental basis and expects to be turning out commercial quantities in April.

At the outset, "substantially all" production will be sold to Allis-Chalmers on a contract basis. Sheets will be of transformer quality.

The Crucible-Allis-Chalmers deal had been known in the industry for months, but details were not disclosed until this week. The arrangement is patterned after producer-customer relationships that have existed in the industry for years.

Allegheny Ludlum Steel Corp. and General Electric have had a close working relationship for approximately two decades. Westinghouse Electric Corp. and Armco have also been cooperating in the development and end use of electrical steels.

"Looks like the old man's getting ready to give somebody an earfull!"

Meanwhile, U. S. Steel Corp. is well on the way toward completion of a program at Vandergrift, Pa., which will make them a volume producer of grain oriented silicon for the first time. They expect to be in production late this year.

Facilities under construction at Midland include a single stand 4-high cold reversing mill with a maximum speed of 2000 fpm, a bright annealing line, and auxiliary equipment. Finished product capacity will be 1500 tons per month.

The rolling mill can be used for cold reducing stainless and titanium strip as well as silicon. Maximum width of material will be 36-in. Hot rolled material will be received at the mill at approximately .080-in. and cold reduced to about .014-in. Coils having a maximum O.D. of 60-in. and weighing 25,000 lb can be handled.

Mill and auxiliary equipment will be housed in two new structures—a main building 92 ft. x 643 ft. and a transcept building 92 ft. x 270 ft.

Booming Market

Facilities will be leased and operated by Crucible in conjunction with its Midland Works.

Crucible has also added a new line for the continuous pickling of carbon sheet and strip to handle transformer steel and other flat-rolled specialties.

The new combine comes at a time when the electrical sheet market is booming. Demand has picked up from virtually all consuming industries — electric power, electronics, television, radio, and appliances. Delivery promises are lengthening. Producers look for a good year.

INDUSTRIALIZATION

PUERTO RICO: Seeks New Industries

Island spreads welcome mat for new business . . . Incentive Act gives 10-year local tax break . . . Aim is 80,000 new industrial jobs by 1960 . . . Metalworking industries sought—By *D. G. Picinich.*

◆ A 10-YEAR TAX BREAK and other special incentives are being offered by Puerto Rico to encourare U. S. industries to set up new operations or expand existing facilities in the Commonwealth. Goal of the program is 80,000 new industrial jobs by 1960 for the island's rapidly expanding labor force.

Nub of the program is the island's 1954 Industrial Incentive Act. The 10-year tax break goes regardless of when the new industry begins business. Act applies if the newcomer files for exemption before 1964.

How Tax Exemptions Apply

Exemption includes income derived locally from operation of the industry as well as most local property and license taxes. Federal corporate income tax doesn't apply since the island has no vote in Congress. In part, the Act provides exemption for specified industries which begin production not engaged in on the island prior to 1947.

Almost any industry qualifies under this provision since there was little local manufacturing before that date. Industries especially sought include metalworking, electronics, apparel, knitwear, plastics, optical products, shoes and leather, small electrical appliances and pharmaceuticals.

Special incentives are granted highly desired business. These include an initial year's free rent and assistance in developing supervisory personnel. A "core" industry such as a metal parts manufacturer would qualify for special incentives. A "core" industry is one supplying essential goods or services which for sound operation must be available in Puerto Rico to local manufacturers.

To save time and effort of U. S. businessmen, the government's Economic Development Administration has experts who offer advice on business plans. They review prospects' proposals and point out both good and bad features of a specific production program. Inquiries should be directed to: Economic Development Administration, Commonwealth of Puerto Rico, Dept. B1, 579 Fifth Ave., New York, N. Y.

Puerto Rico Industrial Development Co. also assists newcomers develop plant sites already built. Multi-purpose buildings have a total of 5000 to 25,000 sq ft of floor space for use by light or semi-heavy industries. Leases are available for initial 5 or 10-year periods with a 3-year purchase option.

Many New Plants Established

Since 1948 more than 300 new factories have been established. Gulf Steel & Wire Co., with a 135,000 sq ft mill, is among recent arrivals. The $3.5 million plant at full production will turn out an estimated 48,000 tons of steel products and 12,000 tons of aluminum products.

Gulf is a "core" firm supplying finished steel items to local factories. Products include electric-welded chain, nails of all sizes, reinforcing mesh and merchant wire.

Wages Are Low

U. S. markets take 90 pct of the island's products. Exports to the mainland in 1953-54 totaled $547 million. Imports from the U. S. came to $643 million.

Eleven vocational schools graduate 6500 students annually. Small parts manufacturers find local labor adept in finger dexterity. Skilled labor has a minimum wage floor of 60¢ per hour.

Puerto Rico's Lure

1. **10-year local tax break**
2. **Special incentives for "core" industries**
3. **Long-term leases with purchase option on multi-purpose buildings**
4. **Growing skilled labor reservoir**
5. **Ready access to major U. S. market terminals.**

ISLAND'S industrial plant stresses facility diversification. "Core" industry sites are afforded ready access to major U. S. terminals.

Manpower:

New list moves many out of essential job class.

Engineers, draftsmen, precision workers, and mechanics are among the occupations currently classed as essential or critical for which draft deferments may be granted. The list was cut by more than 50 pct, reflecting eased manpower shortages.

New list of "currently essential activities and critical occupations" is issued jointly by the Departments of Commerce and Labor. Criteria for the revision, the first since 1952, includes value to the defense program; shortage of manpower in a field; length of training time, and expendability of a job.

Among the activities classed as "essential" are production and maintenance of aircraft and parts, production and maintenance of weapons, precision laboratory instruments, and scientific laboratory glassware; production of electronic and communication equipment, and research and development services.

Included in the list of critical occupations for industry are aircraft and engine mechanics; die setters; design engineer draftsmen and all types of engineers; jib and template makers; machinists; mathematicians, and tool and die makers.

Die makers included in the list are those which specialize in construction, repair and maintenance of dies for metal forming; metal mold makers specializing in the assembly and repair of metal molds for plastics products; tool makers specializing in construction, repair, maintenance and calibration of machine shop tools.

Test Smoke Screens

Army Chemical Corps experts are trying to discover means of providing target cities with smoke cover in the hope that casualties caused by heat from exploded A-bombs may be reduced by as much as 75 pct.

Two kinds of smoke are being considered for defense of target areas. One is produced by heating oil and releasing its vapor into the air, where it condenses. The other is carbon smoke, created by uncontrolled operation of coal and oil burners.

Goal of the Army research program, says Maj. Gen. William M. Creasy, chief of the Chemical Corps, is to confine atomic heat to the blast area. In the Hiroshima experience, he points out, the heat flash covered a 16-square-mile area, while blast damaged three square miles.

He warns that successful studies in the smoke screen field will result in a degree of protection only as concerns heat casualties. Smoke will be unable to reduce the toll caused by blast or pressure waves and by gamma radiation.

Mothballed Plants

Techniques for keeping idle plant facilities ready for quick use in wartime are being compared by defense officials of the U. S., Canada, and the United Kingdom in a new series of conferences.

An inspection of mothballed facilities at the Badger Ordnance Works, Baraboo, Wis., early in March opened the series. The ammunition propellant plant at the installation is described by Maj. Gen. E. L. Cummings, Army Chief of Ordnance, as one of the finest available examples of a preserved defense facility.

"She might seem out of place in this trade, but she sure gets results!"

DEFENSE

Germ Finder Useful

Eventual industry use is predicted for a new, Army-built device intended primarily to warn of a germ warfare attack against the U. S.

Called the aerosoloscope, the instrument measures and counts microscopic airborne germs, dust, and moisture particles at the rate of 100 per second. This capability may make it helpful to paint factories for measurement of tiny pigment particles and to industrial tracers of smog sources.

The aerosoloscope counts particles from one to 64 microns in size a thousand times faster than they can be collected by conventional means and viewed through a microscope. In addition, the device offers the user far greater accuracy, the Army says.

Draft Quota Down

The Army is to take only 8000 draftees during April because voluntary enlistments have risen in recent weeks. This figure is about 5000 below what the Army's monthly "take" in draftees has been running. It means there will be more young men available for civilian employment.

The Navy, Air Force, and Marine Corps will continue to fill their ranks with voluntary enlistments.

Contracts Reported

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Refrigerator unit, 131 ea, $209,453, U. S. Thermo Control Co., Minneapolis 3, Minn.

Periscope, 2800 ea, $600,000, Herschede Hall Clock Co., Cincinnati 6, Ohio.

Air flask, 360 ea, $896,734, A. O. Smith Corp., Milwaukee, Wis.

Fuel tanks, 360 ea, $896,734, A. O. Smith Corp., Milwaukee, Wis.

Periscope, 1800 ea, $414,000, Eastman Kodak Co., Rochester, N. Y., *H. B. Collins.*

Tank, 90 MM T48E2, 4 ea, $750,000, Chrysler Corp., Engineering Div., Detroit, Mich.

Tank spare parts, 31940 ea, $371,539, New York Air Brake Co., Dudco Div., New York, N. Y.

Bearings IFB 40-604-55-43, 100000 ea, $128,000, The Barden Corp., Danbury, Conn.

Projectiles, 40 MM, 2400000, $1,364,424, Harvey Machine Co., Inc., Washington, D. C.

Projectiles, 40 MM, 2505000, $1,352,700, Imerman Screw Prdt. Co., Detroit, Mich.

EXPANSION IN INDUSTRY

Engines:

Plymouth tools up for 1956 model production

A record tooling time of less than a year is the goal of Plymouth Div. of Chrysler in setting up its new engine plant near Detroit.

Plymouth V-8 engines, currently being built at the Dodge plant, will be turned out for 1956 models in a highly automated plant on Mound Road. It is being tooled for a capacity rate of 3000 engines a day, approximately triple the present V-8 production.

More than 850 individual machines incorporating all of the most modern features are included in the $50 million tooling program. Two parallel production lines will be utilized to machine the cylinder block. Each line will be more than ¼ mile long. A total of 157 operations will be performed on 70 machines. The cylinder head line will include 67 different operations. Crankshaft machine alone will require 70 machines, the company pointed out.

Heavy Power Requirements

An outstanding feature of the plant will be the use of an under-the-floor suction system to exhaust dust generated during the extensive cast iron machining operations. The new system will suck 1500 cu ft of air per minute through its pipes.

The trend to more powerful machine tools and increased use of mechanical handling devices is reflected in electric power requirements. The plant will have a connected motor load of 28,000 hp compared with the 14,000 to 16,000 hp required to build about the same number of 6-cylinder engines at the old plant. The new plant has a power estimate of 50 watts per sq ft, probably a new high for the auto industry or for any other industry.

The new facilities will eliminate one of Plymouth's main problems this year, satisfying the demand for V-8 engines. This division found itself unable to meet the customer preference for V-8's over the old six after the new engine was introduced in the highly successful Plymouth styling that marked the 1955 models.

Pennsalt Reaches Out

Pennsylvania Salt Manufacturing Co. is developing mining and milling operations at Salem and Mexico, Ky. near its Calvert City fluorine chemicals plant. Facilities will provide long-range supplies of acid grade fluorspar for the Calvert City plant. Production is expected to start by the end of the year.

Pennsalt's anhydrous hydrofluoric acid is used in atomic energy projects. Other uses include production of gasoline, freons, used in refrigerants and as propellants in aerosol bombs and elemental fluorine.

"Well, that certainly was a short winter."

New Pipe Expander

Bethlehem Steel Co.'s Steelton plant will have new pipe expanding machinery operating in June. The installation is part of the company's 2-year $200 million development program. Pipe produced will help meet increased gas industry demand for overland transmission lines.

The new machinery will produce expanded pipe with a wall thickness up to ⅝-in. to 36-in. O.D. in 40 ft lengths. Hydraulic pressure is used to bring the pipe to required diameter. Cold-working of the pipe to enlarge the diameter will increase yield strength of the steel about 25 pct. It also permits larger load-carrying capacity the company states.

Increase Facilities

Republic Steel Corp. will install a continuous galvanizing line at its Gadsden, Ala. plant. Capacity for rolling a moderate amount of cold-rolled sheets will be included, according to President C. M. White.

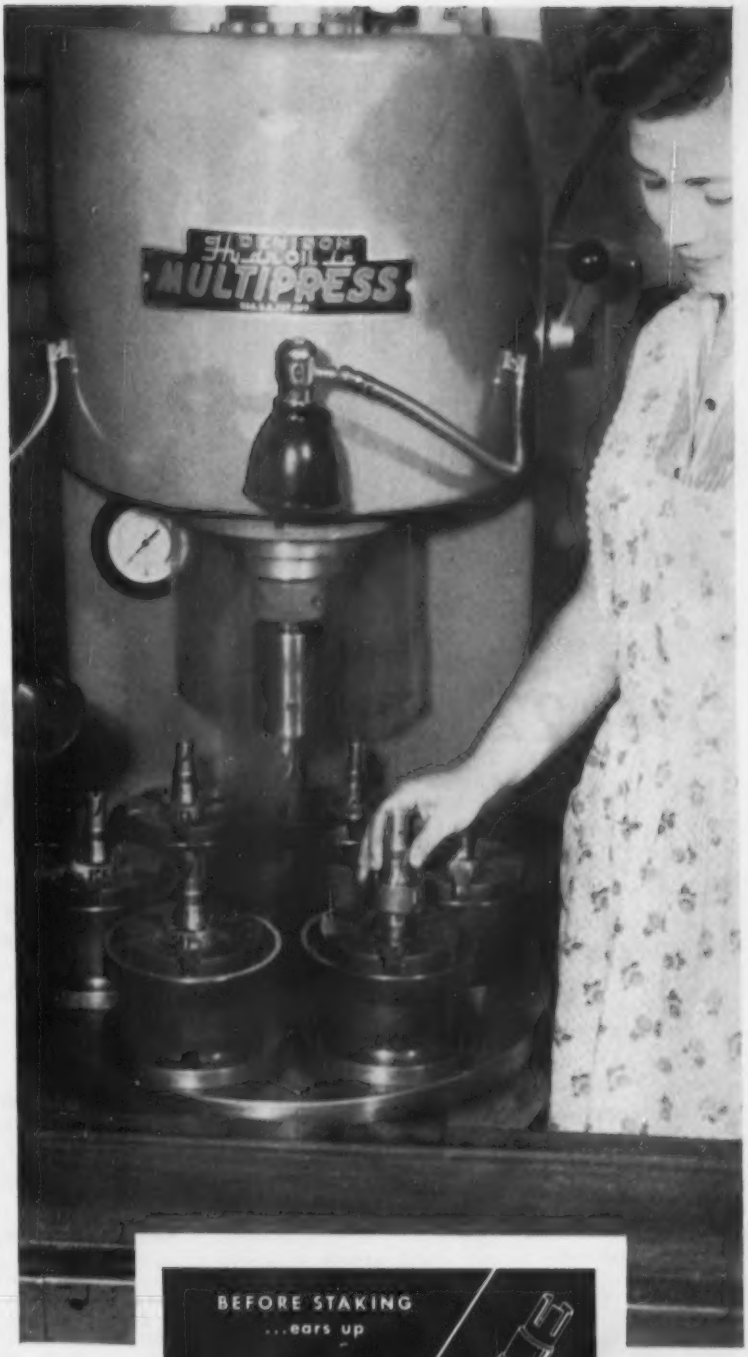
The company may transfer equipment from some northern plants to Gadsden. Also considered is the purchase of new equipment, though what this would be was not stated.

Expand Steel Industry

In a talk to Gadsden businessmen, Mr. White outlined joint experiments with National Lead Co. for using low-grade iron ores by concentrating their iron content. If the experiment is successful, he pointed out, the South will have available a large tonnage of high grade iron ore concentrates. This would form the foundation for a greatly expanded steel industry, he added.

...another cost-saving idea from DENISON

Stakes 475 assemblies an hour with DENISON MULTIPRESS®



Job. Stake sub-assembly of door-lock retractor by pinning back 4 ears.

Method. Load sub-assemblies from conveyor line to Denison Index Table. Table automatically indexes sub-assembly beneath hydraulic ram of Denison Multipress. Accurately controlled single stroke of hydraulic ram pins back 4 ears. Results are uniform. Production . . . 475 units an hour.

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HYDRAULIC PRESSES
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Over 22 tons of die block for "IMPRESSIONS THAT LAST"

Another example of Finkl dependability and craftsmanship are these die blocks each of which is 13"x77"x79" and weigh 22,710 pounds. The face and two ends have been rough carbide milled. The steel is Finkl FX, heat treated to Temper 3 which is 331-302 B.H.N. FX blocks are tough, resistant to checking and washing, and free from temper brittleness. FX can be furnished in special shaped sections of large and small sizes such as rings, discs, round, square, rectangular or half round bars.

From steel making, where quality of material begins, through forging, heat treating, rough and finished machining, and metallurgical testing where quality of workmanship counts, Finkl standards are the highest. For 76 years we have proved that the best is the least costly in the long run. Next time you are considering die blocks or forgings choose Finkl and you will choose the finest.

Write for this free catalog telling all about Finkl die blocks and forgings, the types of steel, the proper selection for the job, how to make dies last longer, and many other helpful facts. Please send request on your company's letterhead.

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FORGINGS • DIE BLOCKS • ELECTRIC FURNACE STEELS

Report To Management

All the Indicators Point Up

Strength of the economy's recovery has surprised even the optimists. The headlines have gone to steel and automotive but most other phases of industry and business have also picked up much more than the experts predicted.

Here's the proof: The New York Times Weekly Index of Business Activity at mid-February was at an all-time high of 200.7. Electric power production, heading for a record year, was running about 12 pct ahead of same time last year. New construction work put in place in January hit a seasonally adjusted annual rate of $40 billion—nearly 17 pct over year-ago figures. Retail sales have been holding firm—topping last year's pace by about 10 pct. And latest reports show manufacturers' new orders are up 24.6 pct from the previous year while sales have edged up 3.3 pct.

What About Those Auto Blues?

You hear a lot of people say the auto industry can't keep on producing the way it is right now. They're right of course—current production is at an 8 million car per year rate and even the most optimistic automakers don't expect to do that well. But a lot of people seem to think the inevitable automotive slowdown means the economy's recovery surge will lose its steam. This won't happen.

Obviously there will have to be a letup in automotive activity but the effect won't be so dire as most authorities anticipate. One factor that's overlooked is that steel users are finding it impossible to get enough steel to add to inventories right now. When the automotive pace slows down there'll be less pressure on steel which will give steel consumers a chance to stock up. You can figure that steel buying for inventory will be an important factor in sustaining the recovery.

It's Better on the Farm Too

Another plus for the economy is the vastly improved attitude of the farmers. Even though farm income will be down slightly this year you can figure farmers will be spending more. They're not so worried as they were last year at this time and they have money to spend because they played it tight last year. This trend is showing up already in the strong demand for wire and wire products and the generally good business enjoyed by farm equipment manufacturers.

Employment Lags Recovery Pace

Employment is not keeping up with the surprisingly fast pace of the general business recovery. Nonfarm employment in January amounted to 48,463,000, only about 1 pct above the July '54 low of 47,982,000.

A factor in the disparity between the big pickup for the economy generally and the only slight improvement in the labor situation is the lengthening of the workweek.

Last April the workweek sunk to an even 39 hours. It increased every month through the rest of '54, hitting 40.6 hours in December. At the beginning of this year the figure eased off slightly to a still substantial 40.2 hours. But the increase in the length of the workweek is still not enough to account for the only so-so increase in employment figures. Result is the evidence points to greater productivity as being an important item. We are turning out more goods with fewer men.

Industrial Heating Equipment Surges

Industrial heating equipment is having a real boom. January new orders totaled nearly $5 million, a 37 pct increase over the January 1954 figure. And in the previous month new orders were 87 pct above the year-ago level.

INDUSTRIAL BRIEFS

Nuclear Council . . . Delegates of the Detroit area engineering, professional and scientific societies, representing companies and institutions interested in the industrial application of atomic energy and its by-products, met recently to organize the first regional joint council of nuclear science.

Metropolitan Office . . . Columbia Steel & Shafting Co. has opened a metropolitan sales office at 1809 Springfield Ave., Maplewood, N. J. Mr. T. A. Harper heads up the office there.

Opened in Salem . . . The Ohio Knife Co. has opened a new office at 140 Penn Ave., Salem, Ohio.

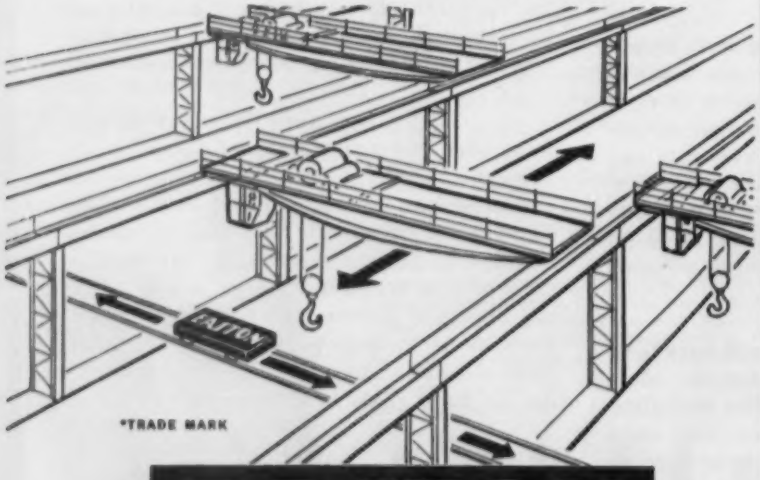
Changes Name . . . Cleveland Tool & Die Co. is the new name of Cleveland Form Tool and Die Co. All officers of the firm remain the same.

Foreign Representative . . . Ralph A. Colorado, San Juan, Puerto Rico, was appointed Export Manager, Whitney Metal Tool Co. and for Rockford Brass Works, both of Rockford, Ill.

Awarded Contract . . . Baldwin-Lima-Hamilton Corp., Philadelphia, has been awarded a $5,086,190 contract to furnish 8 complete turbines for the Barnhart Island hydroelectric plant, New York State Power Authority's St. Lawrence Power project.

Cross-Bay*Transfer

Automatic motor-driven transfer cars provide a universal handling system in modern parallel bay plants now served by overhead cranes. Also for transfer between plant buildings.



*TRADE MARK

EASTON

A-1041

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA. • NEW YORK • PHILADELPHIA • PITTSBURGH

Bought Building . . . Swedish Crucible Steel Co. has purchased the former Nash-Kelvinator building at 8635 Conant Ave., Detroit, for production of automotive steering wheels.

In Succession . . . For the fourth successive year Bohn Aluminum & Brass Corp., Detroit, has won honors for its national advertising campaign. The award jury of Freedoms Foundation at Valley Forge, bestowed the George Washington Honor Medal in highest commendation.

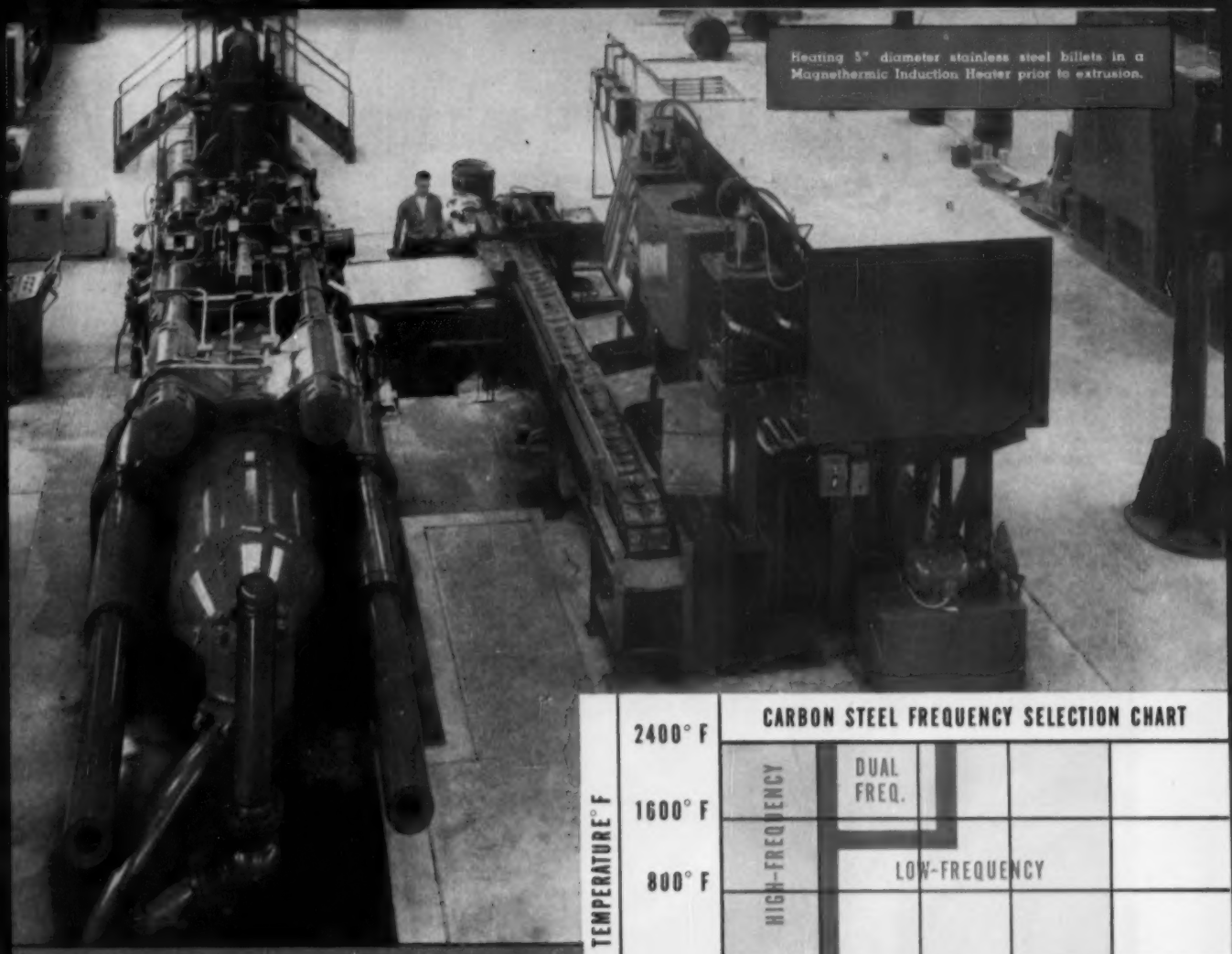
Made a Move . . . Eastern district office of The Yoder Co. is now located at the Ridgeway Professional Building, Stamford, Conn.

World Distributors . . . James M. Motley & Co., Inc., 114 Liberty St., N. Y., has been appointed exclusive world-wide export distributors for engine and gap lathes manufactured by Nebel Machine Tool Co., Cincinnati.

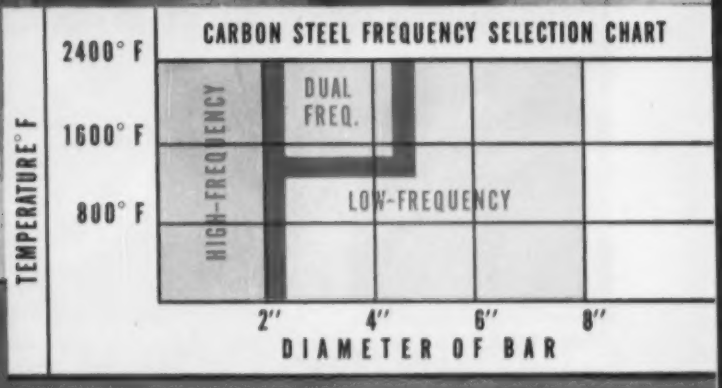
Pays Off . . . First place was awarded U. S. Steel Supply Div., U. S. Steel Corp., for having the most attractive trade show booth at the annual products show sponsored by the Purchasing Agents Assn. of Chicago.

Dallas Office . . . McCormick Steel Co. has recently opened a Dallas office in the Grace Bldg., at 5622 Dyer St. This is to provide extra conveniences to its customers in North and Northeast Texas.

Honored . . . Two hundred veteran employees, Wheeling Steel Corp., were honored recently at a recognition dinner, McLure Hotel, Wheeling, W. Va. Each employee had at least twenty-five years continuous service.



Heating 5" diameter stainless steel billets in a Magnethermic Induction Heater prior to extrusion.



FORGE WITH INDUCTION HEATING

AND DO A BETTER JOB

With induction heat, a 5" diameter steel billet reaches forging temperature in less than five minutes. This rapid heating cuts operating costs by minimizing scale loss, maintenance costs, manpower and floor space. The equipment can be fitted into an automatic processing line, making billet pre-heating just one minor step in a forging operation. This is why modern production forging and extrusion plants are buying induction heating equipment.

Regardless of size of work or frequency, Magnethermic builds the equipment to meet your need. This company specializes in Induction Heating equipment, low-frequency or high-frequency, through 10,000 cycles. Write to Magnethermic for bulletin or information about your specific questions.

60 THROUGH 10,000 CYCLES

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60 THROUGH 10,000 CYCLES

AUTOMOTIVE ASSEMBLY LINE

Tubeless Tires Are Ready for Trucks

Goodyear punctures truck field with tubeless products . . . Weight and time savings are strong selling points . . . Truckmakers also study new rim . . . Blowouts now slowouts—By W. G. Patton.

THIS ACCELERATED test wheel gives Goodyear engineers answers in 2 weeks to questions that would require a year to determine on road tests.

◆ MONTHS AGO a large truck equipped with special tires and carrying 50 pct overload left the Goodyear plant in Akron for a 3200 mile trip. A total of 8 nails was driven into one of the truck tires. At the end of the 3200 mile trip the punctured tire hadn't gone flat. As a matter of fact, the new Goodyear tubeless tires grip nails so successfully that the loss of air even during a 3200 mile trip was negligible.

How good are the new tubeless tires? Many auto industry observers feel they will sweep the passanger car and light truck industry within 5 years. At the present time, tubeless tires are being used by all passenger cars except where the customer wants a wire-spoked wheel. Tubeless tires have virtually eliminated the need for changing tires on the road.

First In Field . . . Last week Goodyear became the first tire manufacturer to extend tubeless tires to the entire motor truck industry. Goodyear's tubeless tire program for trucks can be summarized as follows:

1. Goodyear is the only manufacturer covering the entire truck range at the present time although competition is certain to follow with a tubeless program.

2. A drop-center type tubeless truck tire has been developed for replacement of sizes up to 10-20 in.

3. Goodyear engineers have developed a new design, Tru-Seal tubeless truck rim for all sizes of conventional tires, including the big earth movers.

4. Tire mounting is simplified, reducing tire changing time from 70 min. to 15 min. on a big truck tire equipped with a Tru-Seal rim.

5. Road delays due to nail puncture are virtually eliminated; blowouts are greatly reduced and changed to "slowouts." Tests on taxicabs show road delays due to punctures were reduced from 19 for conventional tires and tube to 4 for tubeless tires.

6. The new tires run as much as 25 degrees cooler, adding appreciably to service life.

7. Weight saving is substantial, approximating as much as 40 lb per axle.

8. The new tubeless tires cost about the same as a conventional tire and tube. Cost of converting 1020 duals on demountable rims will be about $17 per rim, Goodyear officials estimate.

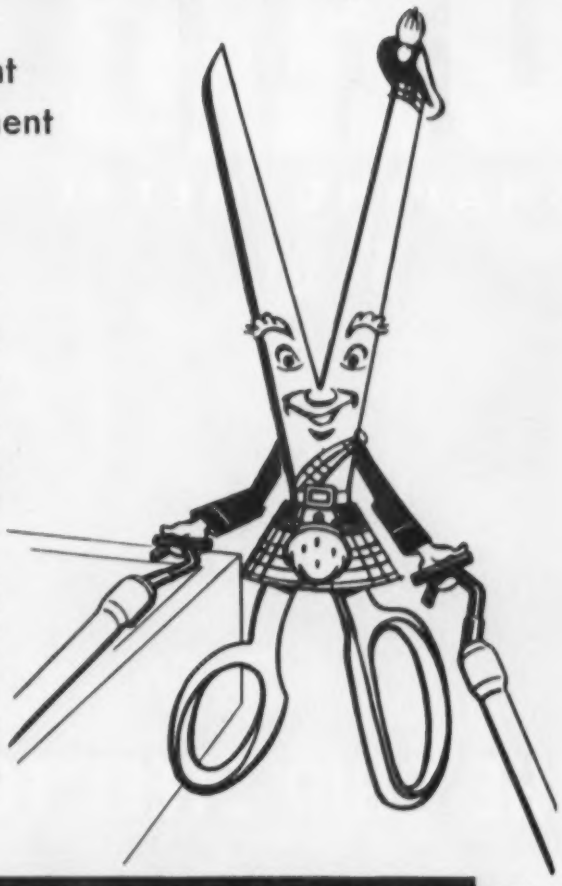
The new Goodyear tubeless tires use an exclusive 3-T process for treating tire cord with latex to seal the cord and make it impervious to the passage of air. During the impregnating and stretching process which also stabilizes the material, the cord is held under carefully controlled tension. Use of this latex-treated cord has entirely eliminated the need for a tube liner.

New Rim Design . . . The second development leading to the Goodyear tubeless truck tire was the creation of a new group of air-locking rims on which the new tires can be mounted. Tire design remains unchanged.

The new Goodyear Tru-Seal rim

New-type anodes reduced plating costs

"Mr. Cost Cutter" shows how plant offset expense of the new equipment with actual dollar-savings



AT ONE plant, ordinary flat lead anodes used in chromium plating needed costly weekly maintenance to remove insulating deposits which built up on their backs. Two men worked a full day each week at overtime—lifting out anodes, brushing them clean, and correcting warpage from overheating.

An original development by United Chromium—*cylindrical* anodes—was brought to this plant's attention by The Unichrome Man. First order for anodes came to $1560.

What a difference the Unichrome Round Anodes made!

Weekly maintenance stopped. The round shape gave better current distribution which ended the need for cleaning. Its rigidity stopped the warping. The payoff: Unichrome Anodes have saved as much as their original cost in reduced maintenance. In addition, they are delivering better plating with lower current and voltage—thereby enabling a standby $29,000 generator to be transferred to other work in the plant!

Here you have another example of how putting United Chromium's long metal finishing experience to work means savings on equipment. May we put it to work for *you*?

MORE WAYS UNITED CHROMIUM HELPS TO SAVE ON COATING OF METALS

More durable protection

Only Unichrome Coating 218X is now used to insulate zinc plating barrels in one automotive accessory plant... because it proved to be the most durable of all plastisol coatings tested for this job, and therefore the most economical.

Plans to production—faster

When one company recently decided to chromium plate diesel engine crankshafts, they called in United Chromium to plan and supply materials and equipment for the operation. Result: The plant is pleased with the speed with which they got a smoothly running efficient set-up.

Chromium plating economies

Recent reports show: Unichrome SRHS Chromium Solution cut power costs 60% for one user. . . . It saved about $3000 a year for another plant by cutting daily bath additions from former 500 pounds down to 300. . . . It gave a shop 66% more capacity with existing equipment.

UNICHROME
Trade Mark

UNITED CHROMIUM, INCORPORATED
160 East 42nd St., New York 17, N. Y.

To finish it better and SAVE call in "The Unichrome Man"

United Chromium offers you the advantages of: (1) 25 years of specialized experience in metal finishing; (2) Wide experience in both organic and plated finishes; (3) A diversified line of products for decorative and functional finishing—including plating processes and equipment, protective coatings, chemical conversion coatings for zinc; (4) Thinking geared to cost-cutting, product-improving possibilities.
We'd welcome an opportunity to help you "Finish it better AND SAVE."

Waterbury 20, Conn. • Detroit 20, Mich. • Chicago 4, Ill. • Los Angeles 13, Calif. In Canada: United Chromium Limited, Toronto, Ont.

Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY

This handsomely lighted and spacious building houses the finest equipment obtainable for machining Ohio Rolls, made in the world's most modern, exclusive roll foundry.

THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO • PLANTS AT LIMA AND SPRINGFIELD, OHIO

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Mar. 5, 1955	180,951	15,683
Feb. 26, 1955	179,406	15,673
Mar. 6, 1954	116,785	22,478
Feb. 27, 1954	122,222	23,758

*Estimated. Source: *Ward's Reports*

is a 3-piece rim which utilizes a small rubber ring to seal in the air. As the tire is inflated, the effectiveness of the seal is increased. At the moment, no truck manufacturer has made a final decision about truck rims for tubeless tires. Several designs, including the Goodyear design, are being studied and evaluated.

Goodyear operates a large rim plant at Akron for the production of truck, bus, airplane and earthmover rims. Most rims are produced from rolled steel sections but flat-rolled stock can be used for some rim designs. No appreciable change in steel requirements per wheel is anticipated although widespread adoption of the Tru-Seal rim could mean an extensive stepup in Goodyear truck rim production.

Atomic Tank:

Detroit Arsenal sees it in future plans.

The Detroit Arsenal is seriously studying plans for an atomic-powered tank.

Col. George P. Peterson, in charge of research and development at the Detroit Arsenal, told the SAE last week that atomic developments by the Navy and Air Force are being watched carefully. It would be possible to build a tank with an atomic powerplant today that would weigh 70 tons or more, Col. Peterson said.

Change Design

Wooden models exhibited before the Detroit engineers, showed substantial changes in tank design might be required if existing atomic powerplants were used.

Col. Peterson also disclosed the Army is studying an "Orion" tank engine which combines the low weight of the gas turbine and the fuel economy of the diesel engine.

Tractors:

Ford expands in farm market

Ford Tractor and Implement Div. is making impressive strides in the farm implement market. Although seriously limited up to now as to the number of models, Duffy has announced that in 1954, one out of every five wheel-type tractors produced in the U. S. was a Ford.

For more than a year, Duffy has been expanding and enlarging the research and engineering activities of the Ford Tractor Div. Important results have already been shown. Last month, Ford introduced five new tractors. This marked an important departure from Ford's traditional position as a "one model" tractor manufacturer.

No Tricycle Yet

Up to now, Ford has not entered the tricycle tractor field, one of the "bread and butter" markets of established tractor manufacturers. This week unconfirmed rumors persist that Ford will soon enter the tricycle tractor competition, thereby bringing the company into a fully-rounded competitive position in the tractor industry.

Air Conditioning Agents . . . Two air conditioning announcements made in Detroit last week reflect the growing interest in this development among automotive merchandisers. MoPar Parts Div., Chrysler Corp., announced it was making a packaged air conditioning unit available for field installation on Dodge 8-cylinder and DeSoto passenger car models. Special kits are used to install air conditioning units in dealer establishments.

Meanwhile, Ford has also announced it will have a new Ford air conditioning unit available for the first time for Ford 8-cylinder passenger cars and station wagons. The Ford design, in addition to cooling, also heats and defrosts.

The automobile industry is confident air conditioning will eventually become almost as popular as heaters are today.

THE BULL OF THE WOODS — **By J. R. Williams**

NO, NOTHIN' FUNNY EVER HAPPENS ON THIS MACHINE! TH' LITTLE CUTTER JUST KEEPS GOIN' AROUND AND AROUND ALL DAY--AND IF IT DON'T, YOU SOON SEE TH' BOSSES COMIN' AROUND AND AROUND!
THAT'S THAT CARTOONIST STILL HANGIN' AROUND TRYIN' TO GET SOME FRESH IDEAS ON TH' LITTLE MACHINES THAT ARE EASY TO DRAW!
TH' ONES HE DOES MAKE HE PUTS A BIG FAT GUY RUNNIN' IT TO HIDE ALL TH' GADGETS! HE GOT OUT OF HANDLIN' 'EM--NOW HE'S TOO LAZY TO DRAW 'EM! BOY, WOTTA LIFE!
J.R WILLIAMS
THE LOST ART
3-11

"BIG ROCKER"

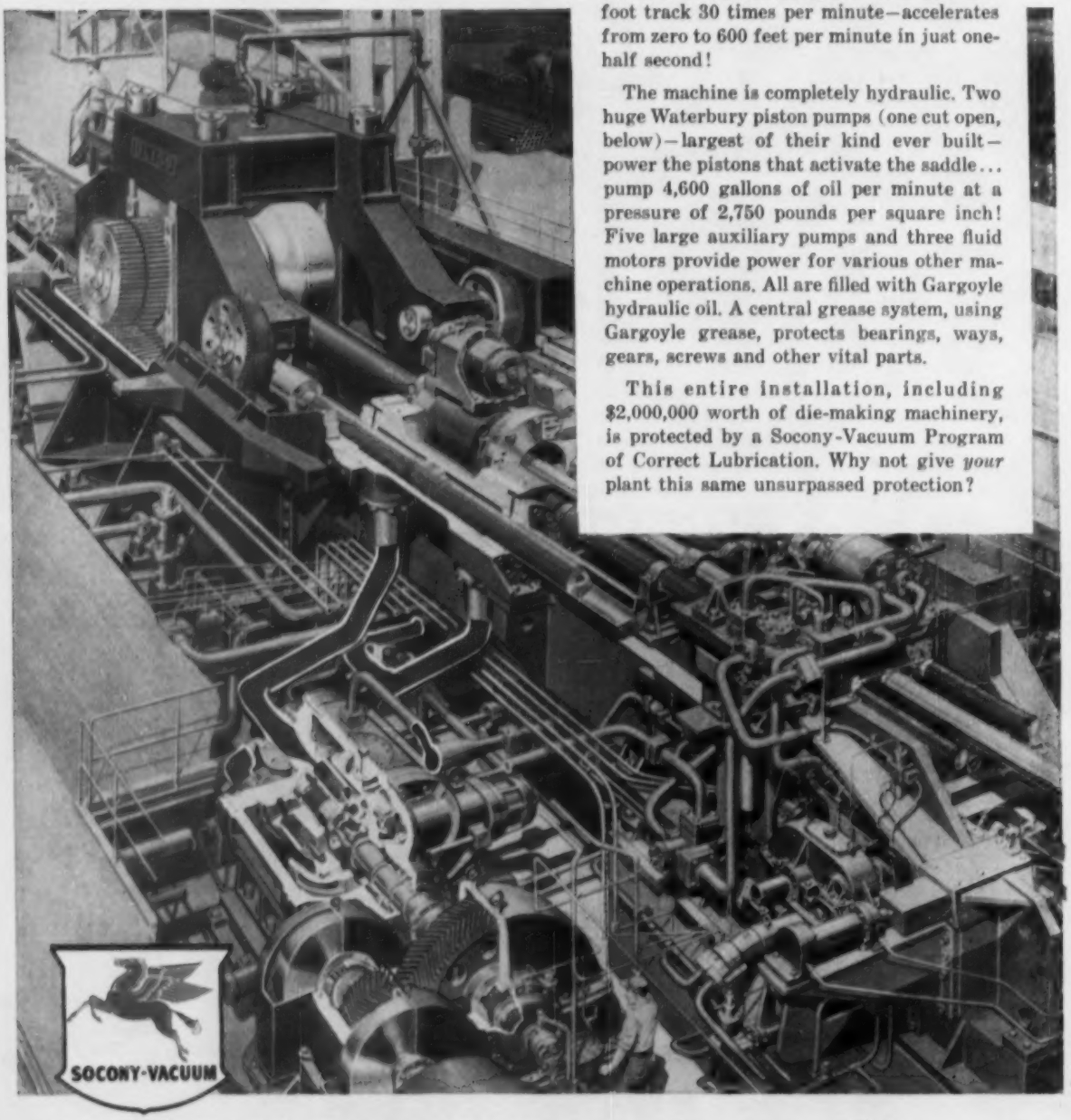
World's Largest Tube Reducing Machine Protected by the World's Greatest Lubrication Knowledge

It's 100 feet long, three stories high, weighs 675 tons! It's the world's largest tube reducing machine, built by E. W. Bliss Co., for the Tube Reducing Corp., Wallington, N. J. This giant takes rough, 18-inch O. D. cold steel tubing and reduces it to between 17- and 9-inch tubing. Finished tolerances are precise.

Heart of the Big Rocker is the "saddle" (top) which holds the huge dies that shape and stretch the tubing. This saddle, weighing 152 tons, rocks back and forth on a six-foot track 30 times per minute—accelerates from zero to 600 feet per minute in just one-half second!

The machine is completely hydraulic. Two huge Waterbury piston pumps (one cut open, below)—largest of their kind ever built—power the pistons that activate the saddle... pump 4,600 gallons of oil per minute at a pressure of 2,750 pounds per square inch! Five large auxiliary pumps and three fluid motors provide power for various other machine operations. All are filled with Gargoyle hydraulic oil. A central grease system, using Gargoyle grease, protects bearings, ways, gears, screws and other vital parts.

This entire installation, including $2,000,000 worth of die-making machinery, is protected by a Socony-Vacuum Program of Correct Lubrication. Why not give *your* plant this same unsurpassed protection?



SOCONY-VACUUM *Correct Lubrication*

FIRST STEP IN CUTTING COSTS

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

See Less Danger of War With China

Threat still present but tension has eased . . . Public reaction leaves Congress wary of war risks . . . Air Force will buy more parts abroad . . . Congress likely to vote new big carrier—By G. H. Baker.

◆ POSSIBILITY of a Chinese war involving the United States is not to be entirely written off, but it's beginning to look more and more unlikely to some of the Eisenhower Administration's experts.

Last year, when the French were in hot water in Indo-China, the U. S. was a lot closer to war than most people realized. There were plenty of policy makers in the State Dept. and in the Defense Dept. who wanted this country to bail out the French colonials. News of their plans leaked out, and the resulting flood of protest mail that deluged the White House and the Capitol caused the Administration to abandon the idea of jumping into the Indo-China battle.

Now, as a result of nearly getting its fingers burned last year, the Administration is shying away from the idea of an Asiatic war. Coincidentally, the Chinese Communists are dropping new peace hints, such as the prospective release of interned U. S. flyers.

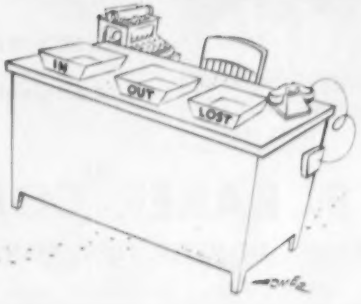
A look at the kind of mail congressmen are receiving these days shows that the country at large clearly does not want to enter a foreign war this year. Letters from every section of the country reflect a strong desire to avoid the pitfalls of a struggle with Communist China.

Will Buy Abroad . . . Air Force will buy a greater share of its metal parts and components from foreign manufacturers in the months ahead. Plans are now being readied for the purchase from manufacturers overseas of about 400,000 different aircraft items. Long-range goal is to increase this number substantially.

The pattern of procurement as it is now being shaped in Air Force headquarters is to place greater reliance on the production of components by metalworking firms located in Germany and Japan.

Under the new buying plans, U. S. firms working on Air Force orders will be directed to lend samples of production items to the foreign manufacturers for tooling-up purposes. Later, when the foreign manufacturers are in production, the Air Force will enter into long-range contracts with them.

In recent weeks, there has been a substantial increase in the number of requests received at the Pentagon from foreign manufacturers seeking business. Metalworking firms in Japan in particular have plenty of idle capacity for production of small items and are eager to bid for Air Force contracts. Due to their generally lower costs, the foreign firms nearly always quote lower figures.



How To Coat Titanium

Two new government reports tell how to apply tough coatings to titanium and its alloys. Such coatings—if they are hard, adherent, and ductile—add much to the useful life of the titanium or titanium alloy to which it is applied. Write the Office of Technical Services, U. S. Department of Commerce, for reports PB 111533 and PB 111534, priced at 75 cents each.

May Okay Carrier . . . There's a strong possibility that the Congress will vote up to $200 million for a new super carrier for the Navy. Opposition, while strong, has slowed down lately.

The U.S.S. Forrestal, first of the giant (60,000-ton class) carriers, is now undergoing final fitting out. The other super carriers are under construction, and a fourth is to be started soon.

A new carrier, when authorized by Congress, will most likely be built on the West Coast. This would be the first super carrier to be built away from the big East Coast shipyards.

Opposition springs from congressmen who believe the super carrier is outmoded. They reason that the next war will be decided quickly on the basis of atomic attacks from land-based aircraft. Seagoing aircraft carriers, they claim, will be totally useless in the lightning-fast kind of warfare that lies ahead.

Turn Page

FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

BIRTHPLACE OF A GIANT

In 1644, twenty-two years after the massacre at Falling Creek, Virginia and the destruction of America's first blast furnace, the first producing ironworks was started on the banks of the Saugus River, halfway between Boston and Salem, Massachusetts. These works included a small blast furnace and a forge.

At the Saugus Works the first casting in America was made by Joseph Jenks. It was for an iron cooking pot of about one quart size. The pot and lid together weighed about 3 pounds, and on the inside measured 4½ inches in width and depth both. From this small casting today's gigantic iron and steel industry has grown.

The J. E. Baker Company is proud of their part in this tremendous growth. To help producers get more uniform ingots and increased furnace efficiency at lower refractory costs, BAKER'S MAGDOLITE, the original dead-burned dolomite was developed. Down through the years, BAKER'S MAGDOLITE has maintained a superior product that is constantly 5 ways better: Composition, Preparation, Strength, Economy and Quality. The next time you order dead-burned dolomite, specify BAKER'S MAGDOLITE.

2-55

ANOTHER FAMOUS FIRST

JEBCO PRODUCTS SINCE 1889

BAKER'S MAGDOLITE

The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

Cut Price Break . . . Defense Secretary Wilson has cut the price differential for domestic companies over foreign from 25 pct to 6 pct. This will mean a military buyer confronted with legitimate bids from both U. S. and foreign firms must take the low foreign offer if it is more than 6 pct under the low domestic bid.

Exceptions are provided to the tighter contracting policy. A contractor may reject a lower foreign bid if:

1. Maintenance of a vital industry as part of the mobilization base would be endangered otherwise.
2. The contract, valued at more than $10,000, is to be turned over to U. S. small business, promised a fair share of military orders.
3. Most of the work on an award of $25,000 or more can be accomplished in a domestic high-unemployment area.
4. National interest, not including the above cases, requires rejection of the bid.

Coal:

Committee says capacity lag endangers U. S. defense.

Government mobilizers are fearful that shutdowns of slot-type coke ovens and the depressed state of the coal industry will leave the country dangerously unprepared in case of an emergency, and are urging federal and private action to bolster the coal-coke industry.

Recommendations recently presented to the White House by the President's special committee on energy supplies and resources are now under study.

Urge Foreign Credit

In the case of coke, the committee warns that present and prospective rates of shutdown and dismantling of slot-type coke ovens will leave inadequate coking capacity to support full mobilization production of steel and other essential wartime industries. The Office of Defense mobilization is urged to prepare plans now to get coke production "rapidly" expanded in case of an emergency.

Coal freight rates and coal exports were also studied by the committee. It recommends that the government urge foreign governments to reduce discriminatory restrictions against imports of U. S. coal, and if necessary consider "discriminatory" restrictions—when U. S. coal is not purchased although the price is no higher than foreign coal—in making loans to foreign governments.

The report also urges federal officials establish credits to foreign banks when possible to permit coal exporters to offer more favorable terms; enlarge participation of U. S. coal in foreign aid programs, and compensate U. S. industry for higher shipping rates to foreign ports when they are incurred as a result of a requirement that 50 pct of all shipments be U. S. ships.

Railroads, by voluntary action or through the Interstate Commerce Commission if necessary, should adjust freight rates to "remove the excessive and disproportionate contribution that coal rates are making to meet the cost of other unprofitable services of the railroad industry," the report urges.

Eye Steel Marking

Federal officials are watching with interest steel company plans for more thorough marking of selected products. One of the latest types of continuous marking to be tested is offset printing, which a number of steel firms are giving a trial this month. Experiments with transparent tape and direct printing to label specific steel items also are reported.

"Good job, Bromide! But wouldn't it have been easier to fix the roof?"

Some companies have told the U. S. Commerce Dept. of their research on use of continuous hot impression markings for tubular products. The continuous symbols would improve on the former method of placing identifying marks near the end of tubing, where it would be lost if the tube were cut.

Slip-ups such as occurred in delivery of an incorrect batch of pipe to the builders of the submarine *Nautilus* last year could be prevented by proper continuous marking, responsible officials say.

Share Study Cost

Cost of developing information in the field of high temperature piping will be shared by the Atomic Energy Commission and the American Society of Mechanical Engineers.

ASME will contribute $10,000 and free engineering consulting services to the $25,000 study of thermal fatigue in ductile metals as part of the AEC's reactor development program. Industry, with an immediate need for information on heat transfer systems, will be permitted to observe testing facilities. Results of the study at the AEC's Knolls Atomic Power Laboratory at Schenectady will be made public.

Protest Acid Sales

Sale of Army's spent sulfuric acid from its Joliet, Ill., arsenal is having an adverse impact upon the market in that area, representatives of the sulfuric acid producing industry complain.

Industry, through the Commerce Dept.'s Business and Defense Services Administration, is asking the Army either to sell its acid only to producers in the area; lease the plant to industry or close it down and buy commercial acid.

This leadscrew "leads" a double life!

Two views of the Lodge & Shipley Hollow Spindle leadscrew show reversibility feature.

No need to replace the leadscrew of your Lodge & Shipley Oil Country Lathe if it eventually becomes worn on the head end. Simply reverse the leadscrew, end for end, for renewed accuracy.

On an Oil Country Lathe, most of the work is done close to the spindle nose. As a result, the greatest wear occurs at the headstock end. Lodge & Shipley's unique reversible feature provides real savings by doubling leadscrew life.

It's one of the many reasons why the versatile Lodge & Shipley Oil Country or Hollow Spindle Lathe is in demand far beyond the oil fields. Equally efficient for very long pieces chucked through the large hole in the spindle, or for normal between-centers work, it saves capital investment and floor space. And, the two-speed tailstock makes drilling large holes easier.

Write for detailed literature: The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.

LODGE & SHIPLEY HOLLOW SPINDLE LATHES

Lodge & Shipley *....your* **LODGE-***ical choice!*

Western Push Presses Toolmakers

Business is there but demands are exacting . . . Many need new equipment, financial assistance . . . New strip mill at Los Angeles will have diversified output—By R. R. Kay.

◆ TOOL AND DIE shops in the 11 Western States feel the future should be jumping for them. But first they've got a tough problem to bore through.

Job shops here have good reason for an eager, optimistic forward look. Some 1500 of them, averaging 30 employees, are sitting in the middle of an industrial area of expanding businesses which need special tooling.

Aircraft, electronics, missiles, and durable goods fields will require more and better tools — stamping and forging dies, jigs, fixtures, molds, gages, and special machines. In fact, the demand from the electronics industry, concentrated in southern California, is already on them.

Right now, tool and die makers here are just holding their own. Backlogs are down to only two to three weeks, and the work now coming in is mostly overflow from captive shops. Still, they expect to do over $100 million of the $750 million national estimate for 1955.

Closer Tolerances . . . But before the tool and die people can reap real benefits from the new businesses growing in their backyards, they've got to do some tall figuring. Their customers are breathing down their necks for closer and closer tolerances. No longer happy with tooling constructed to tolerances of + or — .001 in., the demand is now for + or — .0001 in. or better.

This means new, up-to-the-minute machinery for the tool and die job shops. Five-year-old machinery can't be rebuilt to fill the bill. Equipment for this closer tolerance work is estimated to cost several times more than the equipment it would replace. Most western tool and die shops simply aren't big enough to stand the cost. Getting that kind of money isn't easy, they say.

Men in the industry are plugging for government help. They feel there should be faster write-offs for the considerably costlier new machinery. Also, they point out that this would put the special tooling industry in a much stronger position to meet any emergency defense requirements.

ASTE Goes West . . . Western metalworking executives and engineers are converging on Los Angeles for the American Society of Tool Engineers' Western Industrial Exposition and national convention, March 14 to 18 at Shrine Auditorium. It's the first held on the West Coast. More than 40 speakers on presswork, processes, management, and precision control will be heard. Some 270 companies will display their wares. It will be a good opportunity for management and engineering personnel to see the latest in machines, tools, and processes.

Look for more diversified use of strip on the West Coast. A new Sendzimir cold reduction cluster mill to roll strip up to 13 in. wide is going in at Calstrip Steel Corp., Los Angeles. The new mill, believed the first west of Chicago, will handle not only low-carbon steel but spring steel, stainless, aluminum, and nickel.

Electronics, aviation, and automotive industry people have already shown an interest in a western source of supply for such a variety of strip, J. E. Lewis, Calstrip president, told THE IRON AGE.

Ford Workers Stick . . . It pays to keep your employees informed. For two years, Ford Motor Co. used its plant newspaper at the Richmond (San Francisco Bay Area) assembly plant to keep employees posted on progress at a new replacement plant going up 50 miles away at Milpitas, Calif. By the time the Richmond plant closed down (see THE IRON AGE, Feb. 24, 1955, p. 59), enough enthusiasm had been aroused, so that all but 30 of the 1800 employees moved to the new plant.

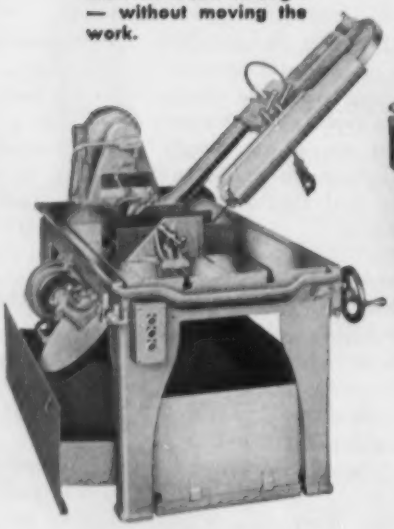
Pacific Steel Casting Co., Berkeley, Calif., is adding $100,000 worth of new steel foundry equipment . . . National Iron Works, Inc., Alameda, Calif., plans a $51,000 expansion.

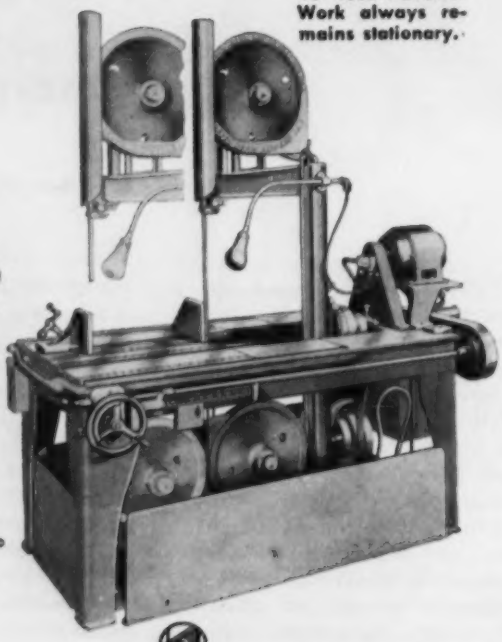
Never Confuse the No. 8 MARVEL with an ordinary Band Saw

...only the MARVEL is Universal

Only on a MARVEL No. 8 does the blade remain at a right angle throughout its full 18" feed traverse. Work always remains stationary.

Only on a No. 8 MARVEL can the saw column be instantly indexed and locked at any angle from 45° right to 45° left, and the saw then fed thru the work at the desired angle — without moving the work.





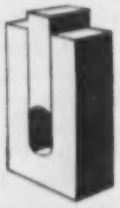
Only a No. 8 MARVEL can do all of these things: Snip-off a ½" rod or cut-off an 18" x 18" cross section

Rough to Size and Shape

Miter

Index

cut off and shape Structural Beams.



Only a No. 8 MARVEL has the large T-slotted work table, with removable quick action vise, that permits accurate set-ups of work of unrestricted sizes and shapes, special fixtures; Etc.

"Rough Machine" to size and shape with minimun chip waste

The No. 8 MARVEL is the "busiest tool in the shop" wherever installed because it is a *universal* tool—has both the capacity and the versatility to handle not only standard sawing jobs but innumerable "trick" and convenience jobs as well. More than a metal saw, the No. 8 MARVEL is a fine machine tool with machine tool features like: Both power and hand feeds; Depth Stops; Automatic Blade Tension; Built-in Coolant Pump; Three operating speeds (or six with 2-speed motor). Moisture-proof electrical controls that conform to both "J.I.C." and "MACHINE TOOL" electrical standards; Dirt-proof ball bearings, etc.

If you cut, machine or fabricate metal, this is a sawing machine you should know about. Write for catalog.

MARVEL Metal Cutting SAWS

Better Machines-Better Blades

ARMSTRONG-BLUM MFG. CO. • 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

MACHINE TOOL HIGH SPOTS

Ford Takes A Look At Automation

Company spokesman names good and bad points . . . Better quality, increased production are benefits cited . . . Maintenance is seen as a big cost factor but gains outweigh drawbacks—By *E. J. Egan, Jr.*

◆ "BRAINS" department of Ford Motor Co. was set up just about 8 years ago, in the early part of 1947. Its job was to develop systems for automatic parts handling between manufacturing operations. Its purpose was to reduce manufacturing costs, increase machine tool efficiency and improve product quality.

A machine tool builder or user doesn't need three guesses for the name this group eventually received. It became the automation dept., one of the company's busiest, most productive and most respected planning agencies. It has been most successful and intends to remain so.

How They've Done . . . A Ford spokesman recently assessed the firm's experience with automation. Speaking at a Society of Automotive Engineers meeting in Detroit, G. G. Murie listed five advantages and four disadvantages for the automation concept.

According to Mr. Murie, these are automation's advantages:

1. Lower production costs by reducing manual parts handling. This does not mean elimination of all manpower, but rather a redistribution of workers and an accompanying need for more and more skilled employees.

2. Increased production per machine by eliminating inherent delay in loading and unloading. Automation enables the machine to be operated closer to its designed capacity.

3. Increased quality of each part manufactured and reduced damage caused by parts hitting each other or dropping to the floor.

4. Safety is increased to a great degree by eliminating hazardous handling of such parts as large stampings, engine parts and heated items.

5. Improved working conditions through reduction of worker fatigue. Decisions to perform operations on workpieces are made by control panels and the actual labor is done by mechanical devices.

On the Other Hand . . . Mr. Murie also listed the following disadvantages and emphasized that these must be fully analyzed to evaluate an automation program:

1. Maintenance problems and costs that could offset the savings expected from automation. Because many departments are completely automatic, any breakdown of even the smallest element could shut down the entire line. Preventive maintenance is a must.

2. Engineering costs are especially high because of the need for coordination among plant design, processing, tool and die design, material handling and machine tool builders.

3. Installation costs can be minimized by planning the installations to occur at model change time when many rearrangements are often necessary.

4. Specialized nature of automation equipment as opposed to general purpose machinery is a factor. And the great variety in design of load and unload stations on machines coming from different manufacturers must be considered, Mr. Murie pointed out.

The speaker left no doubt that in general, automation's advantages far outweighed its potential cost hazards. At Ford, careful planning helps determine the extent of automation that is justified by the cost factors. And the company often finds that the right automation equipment costs little more than standard equipment.

GM Boosts Tools . . . Still another example of coordination between the machine tool and automotive industries is found in a little booklet distributed on General Motors' employee information racks. Its title: *The Adventures of Countersunk J. Lathe, or What the Machine Tool is Doing to Civilization.*

The booklet tells an amusing cartoon story of how more and better machine tools have given the U. S. the world's highest standard of living, and adds that "the best is yet to come."

American Gear Manufacturers Assn. index of January business volume in the gearing industry is calculated at 140.9. This is a 22.6 pct drop from the Dec., 1954 level of 182.2. A year ago, the Jan., 1954 AGMA index was 167.4. All figures are calculated to compare with the 1947-49 index base of 100.

for the "NEW LOOK" in VERTICAL TURRET LATHES

SEE THE NEW

BULLARD CUT MASTER

Completely redesigned with many exclusive engineering features that make it the *most modern on the market today* including:

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PENDANT CONTROL

Exclusive Bullard design, for maximum machine control from a movable pendant station. Start and stop spindle; selection of speeds, feeds and directional movement of all heads in feed or traverse are quickly and easily accomplished from the Pendant. Interlocks and a stop-all stick provide safety for both operator and machine.

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ELECTRIC CONTROL PANEL

Accessible yet concealed and protected from oil, dust and other foreign matter.

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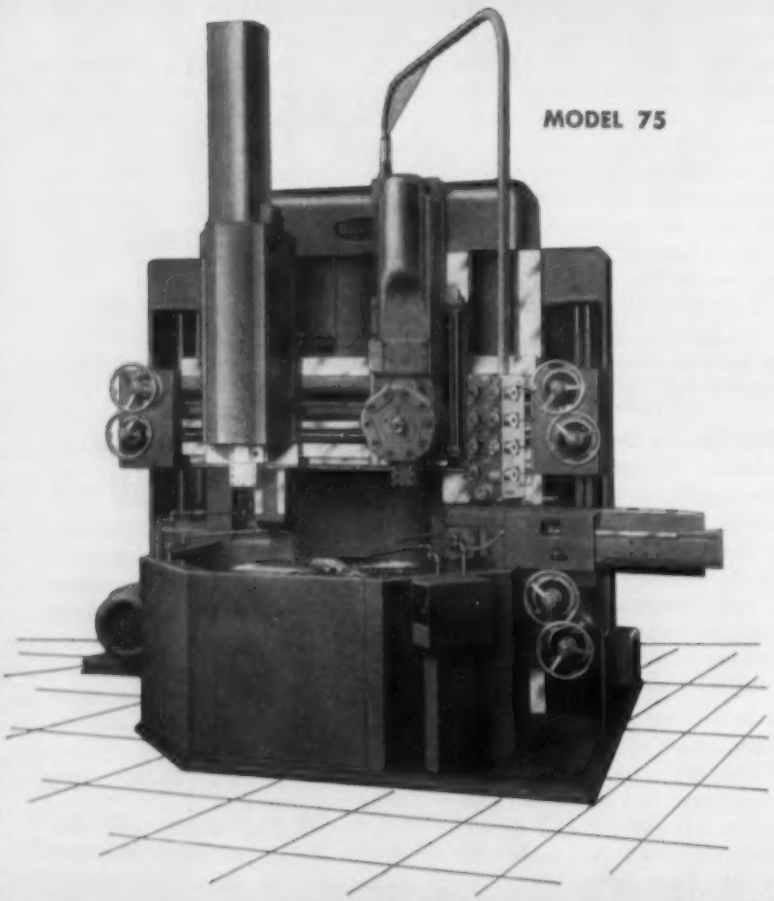
POWER INDEXED MAIN TURRET

(Optional)

Five sided turret for "run of the mill" jobs. Four sided turret for production jobs.

Available in 26, 36, 46, 56, 66 and 76 inch sizes.



MODEL 75

SEVENTY FIFTH BULLARD ANNIVERSARY

THE BULLARD COMPANY

BRIDGEPORT 2, CONN.

The Iron Age

SALUTES

Don E. Ahrens **His rise to a key position in auto sales demonstrates again that the best selling weapon is a genuine liking for people and provides Cadillac with an ideal good will ambassador.**

When Cadillac wants to put its best foot forward with visiting dignitaries, the man they call on is Don Ahrens.

GM vice president and general manager of Cadillac Motor Car Division, Don is first of all a crack executive. His selling and organizing abilities have contributed greatly to Cadillac's strong showing in the high-priced field.

But he is also a bright, genial man who tells a good story and enjoys meeting people. He has personally escorted many American and foreign notables through the Cadillac plant. Hollywood stars are included in his long list of friends. His personality gives added warmth to the welcome mat at Cadillac.

Don E. Ahrens was born in Nebraska. He went to school in the state, receiving a degree in electrical engineering from the University of Nebraska.

Following graduation he moved to the Pacific Northwest and began selling automobiles. He took time out in World War I to serve in the field artillery, then returned to the Coast to take up Cadillac and Hupmobile sales.

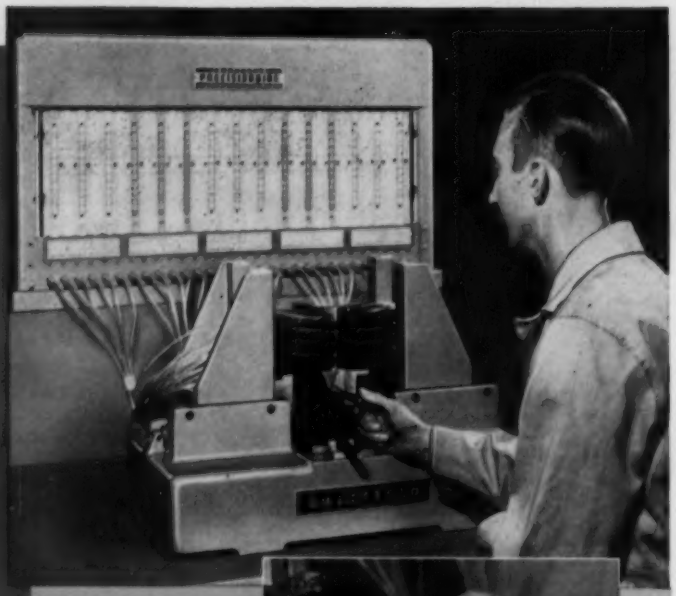
In 1925 Don joined Cadillac with an appointment to the sales staff at the Chicago factory branch. He moved to the Detroit factory sales group as assistant general sales manager in 1931.

After interim service in New York as branch manager, Don was named general sales manager in 1935. He was appointed general manager of Cadillac and vice president of General Motors in 1950.

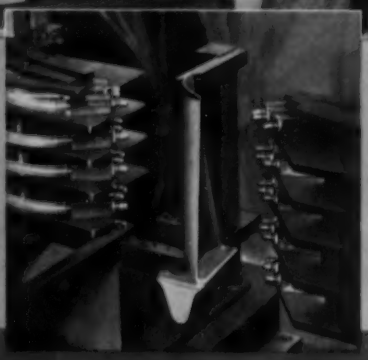
Don's salesmanship and his ability to work with people have been successfully applied to community as well as business activities. Most recent example of his leadership in general affairs was Detroit's annual Torch Drive, which he helped guide to an all-time record.

When he is not sparking auto sales or civic drives, Don Ahrens devotes time to his hobby of collecting guns and will play a little golf. He lives modestly in Detroit with his wife and five children; has a son, Jeff, in his second year at West Point.

YOU CAN GAGE 40 or MORE DIMENSIONS *As Quickly* AS YOU CAN ONE



Checking 30 points on a jet engine blade



Gaging heads ready to approach the jet engine blade

Spectacular developments in AIR gaging are saving industry millions of dollars and thousands of man-hours. Here's how and why:

1. One operator with one gage can check up to 40 or more dimensions of each work part simultaneously and instantly. The number of parts per hour depends solely on how fast the inspector can handle them.

2. Precision is built into the gage—readings are unaffected by human skill, human judgment and human memory. It's not necessary to memorize and compare readings for individual dimensions—one quick panoramic glance at the float pattern ("Airechart") tells the whole story—the "Float Graph" shows the true condition of every critical dimension.

3. The position of each float shows just where the dimension is within tolerance limits or just how much above or below limit if it is out of tolerance. This is essential for Quality Control.

PHONE, WIRE or WRITE for the full story on how YOU can "produce more and better products at lower cost through practical precision"—in this case, multiple dimension inspection by Precisionaire gaging.

Gage Division—The Sheffield Corporation
Dayton 1, Ohio, U.S.A.

All main bearings of a tractor crankshaft are checked simultaneously

6737

MASTER CRAFTSMAN SHEFFIELD HEADQUARTERS

SHEFFIELD

The Iron Age INTRODUCES

Kyle L. Menuez, appointed vice-president and general manager, **Henrite Products Corp.,** Ironton, Ohio.

Marvin Tabak, appointed advertising manager, **AllMetal Screw Products Co., Inc.,** Garden City, N. Y.

Robert A. Putney, named assistant manager, **National Lead Co.'s** metal department, New York.

J. J. Caveney, appointed assistant to general manager, **Wheeling Steel Corp.,** Yorkville, Ohio works.

Alfred L. Gostow, promoted to manager of methods, Forge plant, Dodge Div., **Chrysler Corp.**

John J. Farrell, elected chairman of the board, **Fairmont Aluminum Co.,** Fairmont, W. Va. **Robert T. Farrell,** elected a vice-president.

Rae Hasselbring, appointed manager, industrial metals, **Southern Iron Roofing Co.,** Savannah, Ga.

S. H. Lefton, named general manager, Chicago warehouse, **Nottingham Steel Co.**

Harry L. House, appointed district service manager, **Kaiser Aluminum & Chemical Sales, Inc.,** St. Louis district.

Walton S. Elliot, named assistant to the sales manager, **American Silver Co.,** Flushing, N. Y.

J. N. Rogers, named St. Louis district salesman, Tubular Products Div., Babcock & Wilcox Co.

C. S. Robison, Jr., appointed manager, Filtration Div., **Leader Iron Works, Inc.,** Chicago.

Arthur J. Redmond, named vice-president, **Allied Products Corp.,** Detroit.

Walker L. Cisler and **Alfred J. Gock,** elected directors, **Fruehauf Trailer Co.,** Detroit.

C. C. McDermand and **A. S. Krainik,** promoted to assistants to the president, **Aluminum Goods Mfg. Co.,** Manitowoc, Wis.

W. Jacques Schuler, elected vice-president, sales, **Lovell Mfg. Co.,** Erie, Pa. **Walter L. Kauffman,** elected vice-president, engineering.

James C. Fausch, named manager, New York district sales office, **Inland Steel Co.**

Harry T. Wentworth, elected general manager, **Atlas Valve Co.,** Newark, N. J.

Jerry J. Craig, elected treasurer, **Sun Chemical Corp.,** L. I., N. Y.

John M. Maitland, named manager, Detroit district office, **The Bristol Co.**

Sidney S. Goodwin, elected director, New Jersey Zinc Co., New York. **Lindsay F. Johnson,** named vice-president.

J. D. ROLLINS, appointed vice-president—engineering, American Bridge Div., U. S. Steel Corp., Pittsburgh.

WILLIAM P. KRAMER, elected vice-president in charge of sales, Superior Machine & Engineering Co., Detroit..

CHARLES M. MERRITT, named general manager of sales, Jones & Laughlin Steel Corp., Pittsburgh.

HOWARD E. ROBINSON, promoted to general manager—Product Div., Jones & Laughlin Steel Corp., Pittsburgh.

Wayne F. Strong, elected president, **Iron Fireman Mfg. Co.**, Cleveland. Others elected: **Frank S. Hecox**, vice-president and treasurer; **W. J. O'Neil, C. T. Burg, E. C. Webb, Lewis J. Cox**, vice-presidents; **C. C. Craft**, secretary; **H. J. Mack**, comptroller.

James McMillan, elected president, **Boyer-Campbell Co.**, Detroit.

Charles R. Fay, elected vice-president and comptroller, **Pittsburgh Plate Glass Co.**

Locke H. Jones, Jr., appointed machine tool sales manager, **Moore-Handley Hardware Co., Inc.**, Birmingham.

Robert L. Hutchinson, elected vice-president in charge of operations, and director, **Columbia-Southern Chemical Corp.**, Pittsburgh. **Joseph A. Neubauer**, elected director and vice-president in charge of research and development.

A. F. Anzlovar, named vice-president, **Mercast Mfg. Corp.**, LaVerne, Calif.

Harold T. Henry, appointed vice-president, charge of sales, **Jersey Shore Steel Co.**, Jersey Shore, Pa.

V. C. Lawrence, named manager New York Div., **A. M. Byers Co.**, and **A. N. Voripaieff**, as manager, marine and international division.

Gilbert R. Jarman, appointed general sales manager, all products, **The Marshall Steel Co.**, Philadelphia.

John N. Roche, joined **Motch & Merryweather Machinery Co.**, Cleveland, as a press specialist.

K. H. Hulbert, appointed general sales manager, **Cornwell Quality Tools Co.**, Mogadore, Ohio.

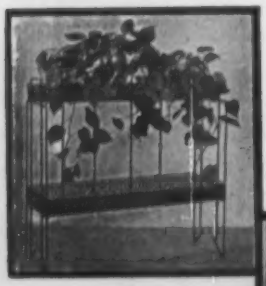
R. M. Ditmore, joined the executive staff, **Red Seal Metals Co.**, S. Gate, Calif.

IRVIN E. WALTON, named vice-president, purchases and traffic, Heppenstall Co., Pittsburgh.

HOWARD G. GRIM, named vice-president in charge of manufacturing, Heppenstall Co., Pittsburgh.

WILLIAM H. FOSTER, named general manager, Pittsburgh Gear Co., Pittsburgh.

GEORGE A. GROSSMAN, appointed sales manager, The Barth Corp., Cleveland.



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Ideal design for the Ideal Mfg. Co.

With today's trend toward modern styling, Hendrick is becoming more and more important to fabricators of metal products. Typical of these is the Ideal Mfg. Co. of Oskaloosa, Iowa, who manufactures the attractive horse furnishing items shown above using Hendrick's Perforated Metal Square Link design.

And this is only one of hundreds of designs Hendricks can supply in commercially rolled metals and gauges with round, square, diamond, hexagonal or slotted perforations. If you would like further information, write Hendrick today.

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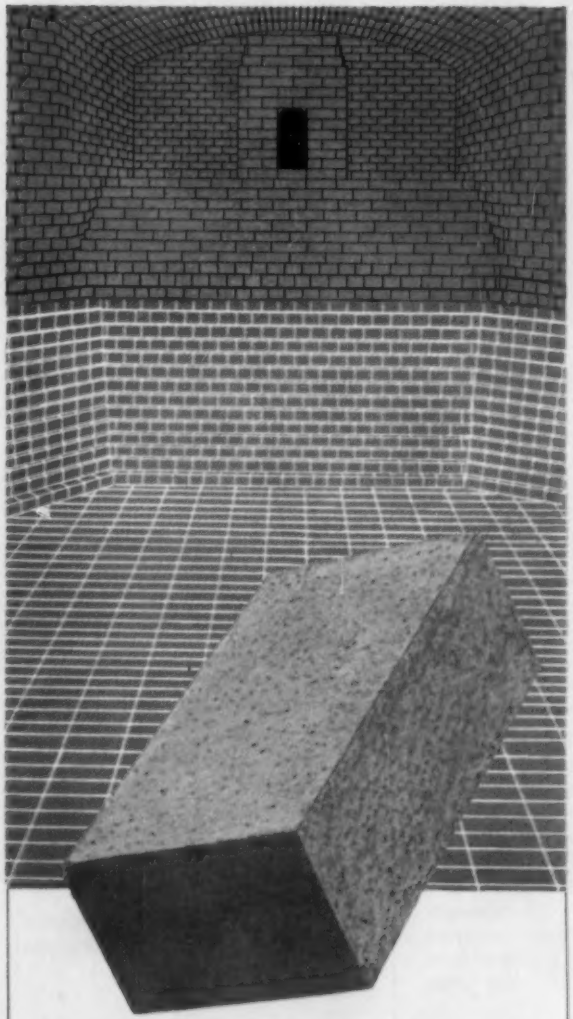
SUPERIORITY

with Permanente Periclase D-S Brick



Permanente PERICLASE Brick for the Steel Industry:

Periclase "D-S" burned brick for open hearth and electric furnace bottoms. Low in iron, lime and silica. Chrome free. Maximum MgO in bottom.

Periclase-Chrome "A," plain and metal-encased open hearth end walls, front walls and uptakes. Metal-encased for electric furnace sidewalls. High in MgO. Outstanding all-purpose refractory.

Chrome-Periclase "A," plain and metal-encased for open hearth back walls, front walls.

1. **High MgO**
2. **Chromite-free**
3. **Low iron-oxide**
4. **Low calcium oxide**
5. **Maximum density; low permeability**
6. **Slag resistance**
7. **Great volume stability**
8. **Clean edges; accurate dimensions**

All of these eight properties—outlined by major steel company ceramists as most desirable for sub-hearth brick—are found in Permanente Periclase D-S Brick.

This superior brick has been *designed especially* to withstand sub-hearth conditions—thus gives maximum protection against costly breakthroughs, gives longer sub-hearth life.

High MgO (more than 95%) is achieved through the use of pre-shrunk, accurately-sized Periclase grains derived from sea-water magnesia. Absence of chromite eliminates the reduction of chromium oxide when the sub-hearth may be in contact with the bath or when carbon monoxide penetrates to the sub-hearth.

Low iron oxide minimizes refractory damage through alternate oxidation and reduction of iron oxide and other iron compounds. Low calcium prevents damage caused by slaking during slow heat-ups or while furnace is idle.

With all its many advantages, Permanente Periclase D-S Brick gives you the ultimate in sub-hearth safety and durability—*yet costs no more!*

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . First National Tower,* AKRON *8, Ohio . . . 518 Calumet Bldg., 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

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Pioneers in Modern Basic Refractories

Basic Refractory Brick • Ramming Materials • Castables & Mortars • Magnesite • Periclase • Deadburned Dolomite

Gage design differs from tool design in a great many respects.

Gage Design is a Job for Specialists

Why do some firms insist on putting their tool designers on the spot? Why do they expect these highly-skilled specialists to engineer satisfactory *gages* for special requirements?

There are two reasons. Tool designers have performed wonders in their own field. So their managements understandably have great faith in them. Tool designers, by their very nature, love to solve problems. So, they accept the challenge involved in special gage designing.

It doesn't pay . . . because the experience of the average tool designer does not give him the answers to these questions: Is a *special* gage necessary? *Which* is the best gaging system for the job . . . air, dial indicating, electric, electronic? *How much* will a specially engineered gage cost . . . if required?

Designing machines, fixtures and tools involves holding workpieces in position by force — transferring and transforming power to act as wanted—counteracting heavy stresses and strains.

Designing precision gages, however, requires knowledge of how to magnify and transfer measurement variations precisely, without loss of motion — with a minimum of friction and inertia in the working parts — and a hundred other details which do not concern the usual tool and machine designer.

To get the right answers . . . call in your nearby Federal sales engineer. He is backed by thousands of Federal gage designs and can give unbiased advice about air, dial indicating, electric or electronic gages . . . because Federal makes them all.

Our new booklet "A Management Blind Spot" reveals unappreciated shop situations and tells how they can be corrected. For your copy, write

Federal Products Corporation, 4139 Eddy St., Providence 1, R. I.

Ask **FEDERAL**

FOR ANYTHING IN MODERN GAGES...

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automatically Controlling Dimensions on Machines.

C. Walter Nichols, elected to the board of directors, **Wellman Engineering Co.,** Cleveland.

Guy M. Karm, appointed purchasing agent, **Aetna Ball & Roller Bearing Co.,** Chicago, succeeding B. E. Vergowe who is retiring.

M. M. Hardin, becomes a director, **Kennecott Copper Corp.,**

George A. Short, appointed chief engineer, **Cleveland Fuel Equipment Co.,** Cleveland.

H. A. Williams, appointed director of purchases, **Eaton Mfg. Co.,** Cleveland, succeeding Vincent Cada who has retired.

R. B. Strosnider, appointed assistant treasurer, **Harbison-Walker Refractories Co.,** Pittsburgh.

Donald J. Zeigler, appointed Pittsburgh district sales manager, Wright Hoist & Ford Chain Block Div., **American Chain & Cable Co., Inc.**

Jerome Wilkenfeld, promoted to assistant technical superintendent, **Hooker Electrochemical Co.'s** Niagara Falls, N. Y. plant.

L. C. Holloman, Jr., appointed manager, Central Sales Region, **Hewitt-Robins, Inc.,** Chicago headquarters.

John Abelt, becomes Kansas City district sales manager, **Chain Belt Co.**

Lewis W. Bentley, named manager, Detroit office, **Industrial Crane & Hoist Corp.**

R. B. Osbourne, elected vice-president - engineering, **Phillips Corp.,** Carnegie, Pa. **John Graham** was named treasurer.

M. Edward Olson, named superintendent, mechanical maintenance, steel plant, Indiana Harbor Works, **Youngstown Sheet & Tube Co.,** succeeding J. R. Price, retired.

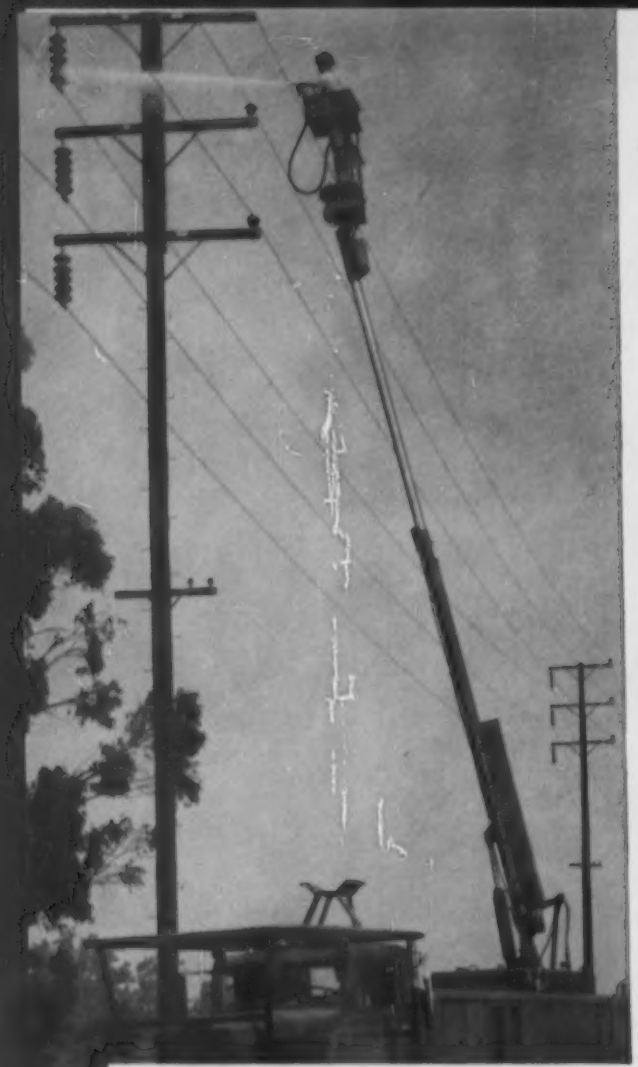
American DiesELectric cuts costs on new Georgia plant

UNLOADS LONG HEAVY BEAMS FAST AND EFFORTLESSLY

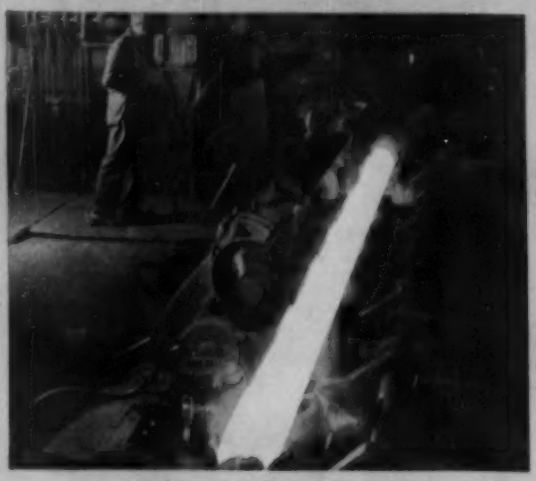
Industry's most-efficient locomotive crane, an American DiesELectric, has proved a major factor in *speeding production* and slashing costs during construction of a new plant at Doctortown, Georgia. For instance, long, heavy steel beams are unloaded from railroad cars with remarkable speed and facility by the American DiesELectric. Whether used on new construction, for handling heavy equipment and supplies at a plant site, or for loading and unloading raw materials, highly-adaptable American DiesELectrics can be the answer to your production problems. Let us show you operating records that prove American DiesELectric Locomotive Cranes can write off their cost in five short years or less. Let us help put your operations on a more efficient basis. For factual information, write American Hoist & Derrick Co., St. Paul 1, Minn.

AMERICAN TRUCK CRANES and Crawlers, as well, combine extreme mobility, efficiency and power for construction and industrial work and for many other uses. Today, as for many generations past, American equipment is the top choice of America's most progressive industries.

BACKBONE OF A NATIONAL



THE HYDRAULICALLY-OPERATED TELESCOPING BOOM of this "Industrial Monkey" is comprised of two sections of USS Shelby Seamless Mechanical Tubing—an inner member and an outer member. These "Monkeys" have many uses, including tree trimming, line work, street light servicing, painting, building maintenance and fire fighting.



THE NATIONAL SEAMLESS METHOD of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No welds . . . no joints . . . no weaknesses.

DEEP WELL DRILLING demands the utmost in strength of tubular materials. National Seamless is chosen consistently because of its ability to resist fatigue, twisting action and collapse. A complete line of National Seamless Drill Pipe, Casing and Tubing is available to meet the needs of the Oil Industry.

SEAMLESS STEEL BOTTLES, 39 feet, 3 inches in length and 24 inches in diameter, hold gas at 2,240 p.s.i. for underground gas storage. Before leaving the factory, each bottle is subjected to a severe high pressure hydrostatic test which insures the user the maximum in safety, top performance and long-time service.

HUNDRED INDUSTRIES...

Seamless Pipe and Tubes

From power plants to cross-country pipelines — in any application where high strength, complete dependability and long life are mandatory—you're sure to find USS NATIONAL Seamless Pipe and Tubes.

NATIONAL Seamless combines to the highest degree the desirable qualities of strength, safety and workability. Uniform throughout and dimensionally accurate, NATIONAL Seamless Pipe and Tubes machine cleanly, weld readily, and promise smooth installation and long satisfactory service. They are available in a complete range of steel analyses, wall thicknesses and diameters. And every foot of NATIONAL Seamless is produced to exacting standards by the world's largest manufacturer of tubular steel products.

Bring your pipe and tubing problems to National Tube. Regardless of the application, our engineers are interested in discussing the problem with you.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.

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WALLS WITHOUT WELDS

UNITED STATES STEEL

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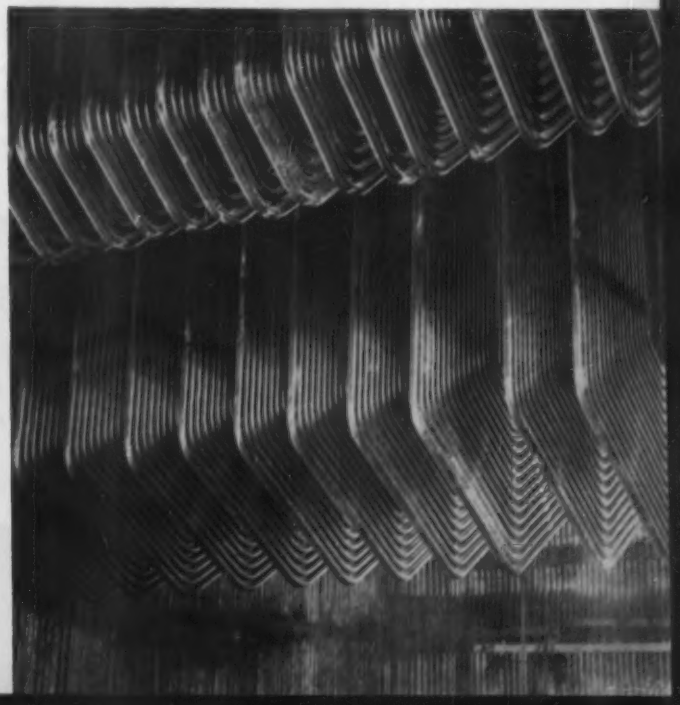
49 MILES OF NATIONAL SEAMLESS TUBES make up this giant superheater. At thousand-degree temperatures, high-pressure steam lines *must* have the strength and uniformity to take constant punishment without failing. National Seamless has never been surpassed for safe, efficient power plant service.



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MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

The Iron Age
FOUNDED 1855
TECHNICAL ARTICLES

Plan for quality—

Good Gears Are No Accident

◆ Production of top quality precision gears requires careful planning at every step plus meticulous attention to manufacturing details . . . First important step is to obtain material which meets the close specifications necessary for precision gear requirements.

◆ Gear forgings must have uniform density, be made from steel of correct grain size and analysis, and forged at controlled temperatures . . . Machines must be maintained at peak condition . . . Cutting tools must be sharp and accurately ground.

By C. R. STAUB, Staff Consultant, Michigan Tool Co., Detroit

◆ CUTTING GOOD GEARS requires meticulous attention to engineering and manufacturing details, plus the broad application of good common sense. Steel analysis, forging quality, condition of machines and cutting tools, intelligent design, and close control at all steps are essential in production of precision gears.

First step is to obtain material which meets the rigid specifications necessary for trouble-free production of gears. The steel must be consistently within the limits of analysis and grain size. Experience has shown that different heats of the same analysis steel, vary sufficiently from heat to heat and within commercial tolerances to be a factor in precision gear production. The change in dimension and degree of warpage resulting from heat treatment may be beyond the close tolerances to which gears are made. As a result, the methods of production, including machining and heat treatment, which produce acceptable gears from one heat of steel, may *not* produce acceptable gears from another heat of steel.

Gear forgings must have uniform density of structure. If the steel is not uniform, it will be difficult to produce uniform forgings. The normalizing cycle cannot be regulated to produce uniform structure. And, without uniform structure, it is impossible to eliminate or anticipate fire changes. Without knowing how gears are going to change in the hardening operations, allowances cannot be made for these changes. If the changes are not allowed for, the error in the hardened gear will be too great to remove except by grinding.

While changes of tooth profile vary from 0.0002 to 0.0005 in., hobs and gear shaper cutters, as well as shaving cutters, can be easily obtained to produce a tooth profile with allowances for this change in contour when hardening. These tools are manufactured consistently to within 0.0002 in. accuracy. The difficult part is to know what change to allow for.

Forgings must be made from steel of a definite grain size and forged at a controlled temperature. Dies must be designed so that full forging pressure is used to compress the forging itself and does not waste material and time

trying to compress a cold flash. This method produces a dense forging, which in both the normalizing and hardening cycles, absorbs and dissipates heat at a uniform and measurable degree. Normalizing temperatures must be uniform at all times. Hardening and drawing heats must be correct.

Worn forging dies may leave a large flash on the forging which may in turn cause considerable trouble. While it is easy to trim flash from the forging, the damage has already been done. In tests, forgings of this type have been marked at the point where the flash occurred, and when the forging was turned, remarked in the same place. After the gear was finished, with the teeth cut and ready for hardening, a check was made and the gear found to be well within required tolerances. After hardening and drawing, the only distortion found in the blank was at the point where the flash appeared on the forging.

Good gear blanks are important in making gears. Blanks should have good holes. Sides should be parallel and square with the bore within reasonable tolerances.

The degree of precision that can be realized in the manufacture of gears depends on the condition of the machine tools available. It is impossible to produce accurate gears on machines that have not been maintained in excellent condition.

Frequent sharpening contributes to total hob life. A sharp hob will cut faster, use less power, and wear longer than one that is permitted to dull excessively. In addition, a sharp hob will produce work having a higher degree of accuracy and a better finish than one not maintained in first class condition.

Most finishing hobs have radial cutting faces on the teeth, others have negative or positive rakes. The gashes creating the flutes and the tooth rows in the hob are either straight or helical. In straight gash hobs, the tooth face is parallel to the hob axis, whereas in helical gash hobs, the tooth face is normal to the hob thread.

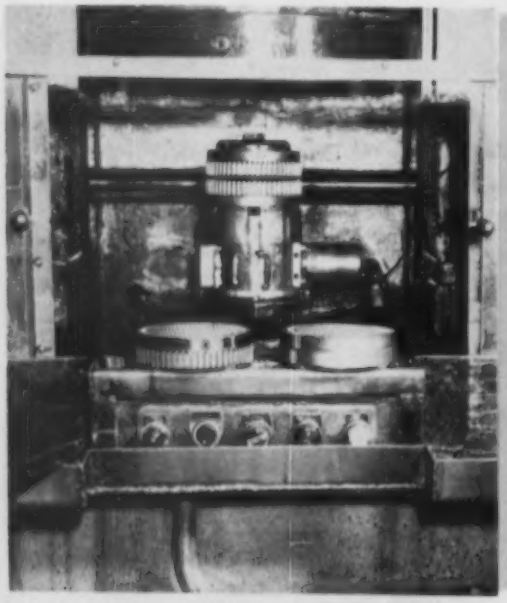
The hob designer takes into account the type of material being cut, the method of processing the part, and the specifications of the required gear tooth profile. If sharpening fails to preserve the original characteristics of the hob, the desired profile cannot be generated in the work.

Check hob accuracy

Specifications for the hob, usually etched on one end, should always be adhered to when sharpening. One way to insure that hobs are correctly sharpened is to check their accuracy on suitable equipment.

First consideration in setting up a hob on a machine is its concentricity with the arbor. A few wide spacing collars arranged on the hob arbor are preferred to many narrow collars. The arbor outer bearing should be in position before tightening the end nut, or the arbor may be permanently sprung. The hub (or proof) diameter of the hob should be indicated. An indicator calibrated in 0.0001 in. should be used.

Hub runout within 0.0004 in. is permissible, assuming that the high point of the runout is



SETUP FOR CUTTING gears by Shear-Speed method. All 59 teeth on each gear are cut at same time in this gear machining setup.

UNDERSIDE of cutter head assembly showing Shear-Speed cutting tools used to form sprockets at left. Note design of cutter blade, center.

unchanged from one end of the hob to the other, and not complicated by wobble which would produce the same thing as a drunken lead in the hob and result in tooth form errors.

Shaping gears has definite advantages, although it is generally conceded that per minute cost is higher than for hobbing, because of the inherently slower process. However, many gears including those with close adjacent shoulders or with internal teeth, cannot be hobbed. Because of certain design conditions, some regular gears, most internal gears, and spline hole gears must be shaped.

The gear shaper can handle both spur and helical, internal and external gears, and non-involute forms such as serrations, ratchets, sprockets, cam lobes, interrupted tooth forms, rectangulars, triangular, and many-sided holes. Special attachments and fixtures permit production of eccentric gears and segments, as well as face gears. If the form can be generated, a tool can be provided to shape the piece.

The only difference between shaping a spur and helical gear is cutter design, and the need of a spiral guide instead of a spur guide. The guide is mounted on a tool spindle to pilot the cutter through its proper helical path. When cutting helical gears, the guide must be included in tooling costs. It is suitable for use on one predetermined helical lead of a given hand, and is confined to use with a cutter of the same hand of helix and same lead.

Another method of shaping gears is by the form tooth (Shear-Speed) method. Its principles might be compared to a modern high-speed internal broaching machine. Either open or shoulder type gears can be formed by this method. This machine has been used for external and internal spurs, ratchets, splines, cam lobes, interrupted tooth forms and sprockets.

Because of required tooling, the machine should only be considered as a high-speed, high-production unit. The slotted cutter head is built to a high degree of accuracy, because errors in slot location would affect tooth spacing on a cut gear. Form tooth blades are ground with an angular hooked tail that is acted upon by an inner cone, causing the blade to retract radially.

After a gear blank is placed on the work spindle, the cutter head slide is actuated hydraulically to come down to cutting position, and locked by two wedges. The work mounting fixture is securely anchored to the top of a ram driven by means of a crank pin to the connecting rod, operating from a crank shaft. Work reciprocates vertically during cutting cycle with length of stroke adjusted to suit the face width being cut.

Cones feed downward

With each cutting stroke, cones feed downward a controlled amount. This causes the blades to feed in by contacting the outer cone on the angular tail of the blade. Downward feed of cones is achieved by means of a cam and ratchet mechanism. As the blade moves into greater depth, and more of the cutting edges engage the gear being cut, the same cam and ratchet mechanism progressively reduces the amount of feed per cutting stroke. Final finishing strokes remove approximately 0.0002 in. of material for fine surface finish.

As each cutting stroke is completed, and work is on the downstroke, an eccentric relief cam raises the cone assembly slightly, and holds it in this position for downstroke of work. This causes the inner cone to pull blades out of engagement with the work. When the cutting stroke starts again, a cam returns the cones to their original cutting position for next cut. Relief action is independent of feed and performs identically on each return stroke.

Finish gears by shaving

Gear shaving provides the means for finishing gears accurately from miniature sizes to 15 ft in diam. This process results in highly finished profile surfaces and improved tooth spacing and form.

In the rotary shaving process, using a serrated master gear as a shaving member, shaving tool and gear are engaged in mesh and rolled together at a predetermined speed. Only one of the members is positively driven, and depending upon machine used and size of gear, either gear or tool can be the driving member.

CAUSES OF NOISE IN GEARS

Probably no one item concerning gears has received more comment than noise. Power is transmitted from pinion to gear, or from gear to pinion through the tooth contact. Noise is generally believed to be caused by the impact of one tooth upon another. This gives rise to the feeling that damage is being done to the tooth surfaces.

Noise readings and sound analyses have been made on objectionable gears where the tooth mesh frequency component was so low as to be undetectible. In many instances, major noise components have been found to result from:

Unbalance of rotating parts.
Misalignment of rotating parts.
Eccentricity of pinion or gear.
Deep notes between various components.
Critical speed variations, or oil whip.
Oil trapping in the tooth spaces.

More negative rakes—

Red Machine Tools: Step Up Use of Carbides

♦ Metalworking production in Soviet Russia has more than doubled since 1940 . . . Weight, motor capacity and rigidity of new machine tools has been increased considerably . . . More recently, high-speed machining, using carbide tooling, has become more widespread.

By DAVID GRANICK, Associate Professor of Economics, Fisk University, Nashville, Tenn.

♦ METALWORKING has long been accustomed to the front-and-center of the stage in the Soviet drama of national planning. It has been prized as the star actor in the buildup of industrial and military power. This story was written in bold type across the map of Russia during the 1930's and has continued to unfold at a rapid rate during and after World War II.

Since 1940, Soviet metalworking production has more than doubled. This has been achieved partly by a sharp growth in the stock of machine tools and metalforming equipment. It has also been made possible partly by organizational and technological improvements.

Advances in metalworking have been manifold. The weight, motor capacity and rigidity of new machine tools have been increased sharply compared to prewar equipment. Continuous-flow machining has come into its own. There has been a rapid expansion of die-forging to replace free-forging. Permanent-mold casting has been given great attention.

A more recent but important aspect in this technological development has been high-speed machining associated with sintered carbides and negative rake. While it was only in 1949 that high-speed machining began to spread throughout the Soviet metalworking industry, this trend has been given major attention ever since.

Recent gains in carbide use

Use of carbide-tipped cutting tools dates from the 1930's. But substantial introduction into Soviet production seems to have begun only in 1949. A further impression of the rapidity of growth in the use of such tools can be obtained from the production figures for the Chief Administration for Tool Accessories of the Ministry of Machine Tools, which coordinates plants specializing in cutting-tool production.

By 1951, carbide-tipped tools comprised about 60 pct of the total number of cutting tools used in one of the important machine tool plants (the Ordzhonikidze plant). Moreover, the trend is continuing. For example, 1952 was a year of major conversion to high-speed machining in the automotive industry. The results can be seen from an overall report for heavy machine building delivered before a major national

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This article is based on data presented in official Soviet technical journals. Consultation with V. I. Tsonev, a Russian engineer until World War II, has been important in interpreting the material. Documentation and sources are in a study prepared by the author which serves as the basis for this article. "Postwar Technological and Organizational Developments in Soviet Machine Building" in The Soviet Railroad Equipment Industry: A Technological Approach to Economic Analysis, Institute for Research in Social Science, Univ. of North Carolina, Oct., 1954.

conference in June, 1952. Periodic analyses of the operating techniques of large machine tools in the industry showed an average improvement in cutting speeds of 150 pct since 1948 to 1949.

In addition to extending the use of sintered carbides for cutting edges, the postwar period has seen the development of new carbides which permit high-speed machining of steel. Soviet metalworking has followed the American pattern, apparently with a few years' lag, of inventing and putting to work new carbides which could do the steel-cutting job which the tungsten-base carbides were already doing on nonferrous metals and cast iron.

Along with greatly extending the use of carbide-tipped tools for machining nonferrous metals and cast iron, and their rapid introduction to the machining of steel, postwar Soviet machining has also featured the use of negative rake angles in metal cutting. And the fourth major development in high-speed machining has been the design of new shapes of cutting tools for added carbide-tip strength.

Production of Carbide-Tipped Cutting Tools

	1947	2
	1948	6
	1949	13.6
(percent	1950	21.0
of total)	1951	17.4

Reports presented at an interdepartmental conference in 1952 by the Academy of Sciences, the Ministry of Machine Tool Building and the Ministry of Higher Education, and participated in by other ministries, indicate that successes in introducing high-speed machining have been achieved mainly in turning and milling work. Most other metal-cutting machine tools (particularly drills, gear cutters, grinders, and semiautomatic and automatic machines) were still worked at comparatively low speeds.

Widespread introduction of carbides, particularly to drilling, still remains a major task. In producing agricultural equipment, for example, it was reported that carbide-tipped tools and high-speed machining were restricted mainly to longitudinal and transverse turning, end-milling and countersinking.

A beginning has been made in other types of machining. Since 1948, plants specializing in cutting tool production have mastered over 1500 different types and sizes of standardized tools for machining openings, as well as almost 500 additional types and sizes of specialized carbide tools. Both in 1949 and 1950, production of new types of drills, countersinkers, reamers and face-disks was expanded.

Machine tools of prewar design suffer from insufficient spindle speed, power capacity and vibration resistance. In 1949, failure to resolve the problems of fastening work securely, of removing chips, and of protecting the operator from flying chips, was considered a major obstacle to expansion of high-speed machining. Even reorganization of auxiliary operations has been considered essential; thus the demand for a centralized tool-sharpening organization within a plant wherever high-speed machining is introduced.

Soviet management has followed two lines of approach in improving basic equipment. The first has been a sharp improvement in the characteristics of new machine tools. Tools produced in the 1950's are considerably heavier and have much greater motor capacity than had the prewar models. In 1953, the rpm's possible in new milling, planing and broaching machines were 100 to 250 pct higher than for older models. However, improvement through the construction of better machine tools is a slow process; half of all Soviet machine tools are more than 10 years old and about one-fourth are more than 20 years old.

The second approach has been to modernize existing equipment. It has been pointed out that much can be done in this field without too great an expense. Yet, a mid-1952 report indicates that modernization had not reached more than a few percent of the total stock of machine tools. There is no reason to believe the situation has changed radically since then.

Spindle speeds neglected

Until now, increased speed in metal removal has been accomplished primarily by increasing the spindle rotation rate. As of 1950, and probably to date, the alternative approach of increasing the rate of feed—particularly in finishing and semifinishing operations—has been neglected. The importance of increased feed has been recognized by a few writers, and was emphasized at the 1952 conference.

Most auxiliary work time is spent on loading and unloading the machine tool, adjusting the machine tool and its accessories, and measuring the workpiece. Little seems to have been done about mechanizing these auxiliary operations. Despite Soviet time studies which show that pneumatic lathe chucks reduce clamping time to 40 pct of that required for manual clamping, pneumatic, hydraulic and electro-automatic fixtures on machine tools are extremely rare. In 1950, only two plants were known to have successfully combined high-speed machining with mechanized auxiliary operations.

Short Cycle Anneal Restores Ductility in Cold Extrusions

By C. A. TURNER, JR., Metallurgist
Selas Corp. of America, Philadelphia

THREE cold extrusion steps in making 2.75 in. rocket heads: (left) slug sizing, (center) backward extrusion, (right) deep-draw. Short cycle annealing treatments follow second and third steps.

◆ Radiant burner furnaces and annealing cycles measured in seconds are part of a fast automated setup for cold extruding 1010 hot-rolled slugs into rocket heads.

◆ Quick heating is equal to conventional long soaking for restoring steel ductility after cold working . . . Annealing furnaces and conveyors are extremely flexible.

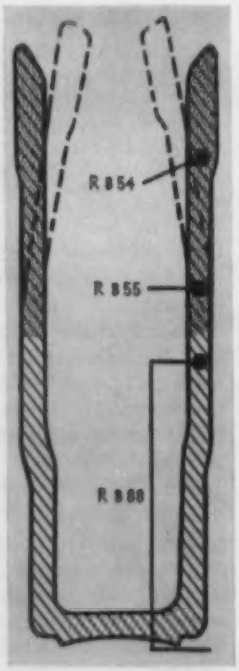


Fig. 1—Furnace flexibility permits selective anneal. Shaded area is annealed; dotted lines show desired deformation. Hardness and structure respond precisely to heat control.

◆ SEVERELY COLD-WORKED low carbon steel—with reductions up to 80 pct in a single operation—is restored to original ductility in a fast cycle annealing treatment which subjects the steel to high temperature radiant heat for a momentary interval.

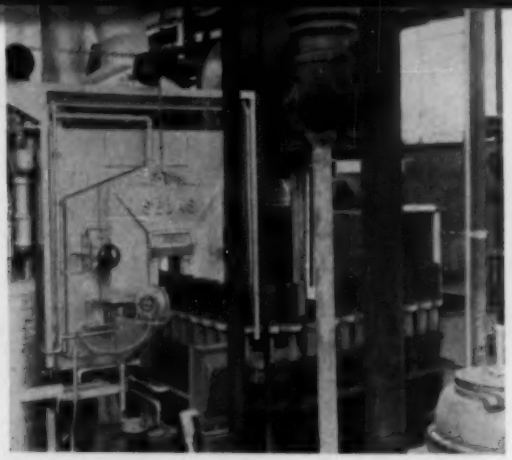
This efficient production-line process replaces treatments requiring hours of soaking heat. But it results in hardness and workability values at least equivalent to, and often better than, those produced by conventional long cycle practice.

Conveyorized processing of individual work pieces through continuous tunnel-shaped furnaces insures uniform physical values—piece to piece and day to day—and sets up many other factors conducive to quality control and lowered costs.

After years of research and pilot plant operation, Heintz Mfg. Co. of Philadelphia recently built an ultra modern production plant for cold extruding rocket heads and other ordnance items.

This "cold forging" technique subjects steel slugs to tremendous pressures well above the yield strength and generally limited only by the strength of the die steels. Extremely close tolerances can be produced, minimizing final machining requirements and greatly reducing scrap loss. Low carbon steels are generally used and can be cold worked to produce yield strength above 100,000 psi.

Work hardening naturally accompanies the various extruding, coining, deep drawing and other forming operations. The maximum practical hardness limit is in the range of RB 100. If further forming is necessary, the work must



ROTATING spindles carry rocket head components into short cycle annealing furnace after deep-draw. Workpieces are processed individually for uniform heating from piece to piece.

be annealed to restore the original hardness level of about R_B 60.

The rapid annealing is done in a battery of six Selas continuous furnaces. Workpieces move singly on rotating spindles through the fast heating and cooling cycles. Outstanding features of the installation are its reduced floor space requirement and maximum flexibility for handling a variety of products at controlled temperatures and production rates.

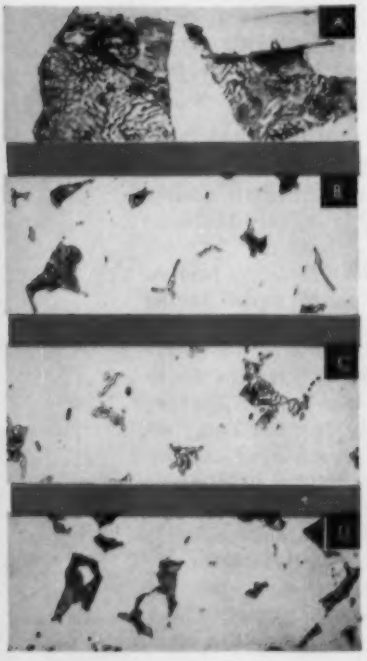


Fig. 2—Annealing influence on final micro-structure in cold extruded 1010 steel. (A) Coarse pearlite in hot rolled bar. (B) Fine pearlite after normalizing slug at 1750° F. (C) Spheroidized carbides after 1750° F slug normalizing and 1400° F anneal of extruded cup. (D) Pearlite after 1700° F anneal of extruded cup. (No prior treatment). All photos 500X.

The furnaces are arranged in pairs to perform intermediate annealing at three processing stages. In each pair, one furnace is designed for a production rate of 350 pieces per hour and the other for 200 pieces per hour.

The paired furnaces can be used singly—or in pairs to increase production rate on a single item to 550 pieces per hour. Each pair of furnaces has a common manual loading station.

Workpieces are conveyed through the furnace and return through a forced-air cooling section for unloading by the same operator. Additional cooling, where required, is accomplished in space-saving, vertical cooling towers. These discharge parts at room temperature onto conveyors for further processing.

The tunnel-type furnaces are fired by radiant burners which stud the walls and roof in an arrangement providing proper heat distribution in the workpiece. All burners are individually controllable and can readily be balanced or adjusted to develop uniform final temperatures on work of non-uniform cross section.

Furnace temperatures are considerably greater than the final work temperature to accelerate heat transfer, and this thermal gradient is automatically maintained. Radiation pyrometers in the furnace sidewall control fuel input through proportioning type control valves in the burner manifolds. Individual workpiece temperature is measured and recorded by a second radiation pyrometer which sights on annealed work exiting from the furnace.

One item produced on the Heintz cold extrusion line is a 2.75 in. rocket head made from bar stock. Press operations on this part include (1) slug sizing, (2) cupping by backward extrusion, (3) drawing, (4) coining the base, and (5) nosing the mouth end.

Slugs for the rocket head are 3⅛ in. in diam x 2½ in. long and weigh 5½ lb. They are cut from hot-rolled bars of aluminum-silicon killed 1010 steel. The first anneal follows backward extrusion because the cold-working done in sizing the slug and extruding the cup increases the hardness to R_B 94.

The extruded cups, mouth-end down, are heated to 1500°F in a furnace chamber 11 ft long. Production is 350 pieces per hour. Pieces are under heat for six minutes and under forced air cooling for three minutes. The companion furnace applies the same heating and cooling cycle to 200 pieces per hour in a chamber 7 ft long. Hardness after anneal ranges between R_B 60 and 65.

The annealed cup is then drawn. This elongation decreases the wall and outside diameter and increases the hardness to R_B 89. The drawn part is then given an overall anneal in another pair of furnaces. This requires five minutes heating time to 1450°F.

After this second anneal and eight minutes of forced-air cooling, the pieces are transferred

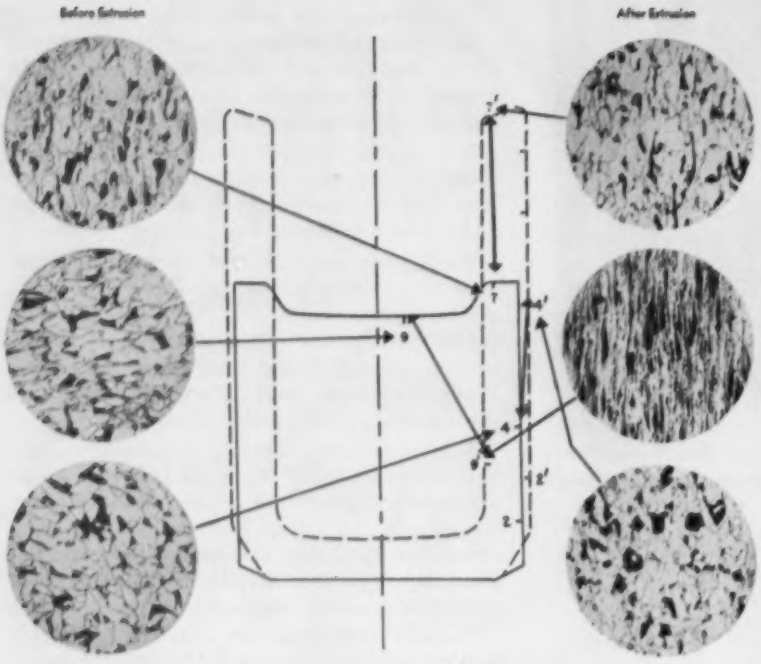


Fig. 3—Dotted lines show metal displacement when slug is extruded backward to form cup. Microstructures show grain at pin-marked locations before and after extrusion. 100X.

automatically to the vertical air cooling tower. Here the work drops to room temperature in 30 minutes. Subsequent press operations of coining and nosing provide the necessary cold-working to develop the ultimate physical properties.

A feature of the furnaces which anneal the drawn cups is their adaptability to selective mouth anneal by a simple change in the conveyor spindles. The mouth end of the cup, projecting into the furnace chamber, may be softened over a localized area for subsequent nosing. Meanwhile the properties of the work-hardened base are maintained. This is illustrated in Fig. 1. This flexibility permits handling a variety of parts with different annealing requirements.

Surface protection during annealing is provided by eliminating free oxygen in the combustion products. This is done by a Combustion Controller which regulates the ratio of premixed gas and air supplied to the burners. Furnace operation under a positive chamber pressure prevents air infiltration.

This combination of a regulated atmosphere and a short work exposure time in the higher temperature range prevents scale formation. Oxide which forms during air cooling is readily removed by pickling for five minutes in a 16 pct sulphuric acid solution at 170°F. The pickled surface is an excellent base for subsequent phosphate coating. It offers advantages over protective atmosphere annealing and cooling cycles which produce no surface oxidation.

The hardness level of an annealed part is established primarily by the ferrite grain size and the steel's chemistry. Coarser grains account for softer structures. Open-hearth deoxidation practice also exerts an important influence. An aluminum-killed steel (0.02 pct Si) will show hardness values approximately 5 R_B points lower than those for an aluminum-silicon killed steel (0.12 pct Si).

The amount, form and distribution of carbon are also important factors. In cold extrusion, the steel is under compression and extrusion pressures are high. Both conditions void the necessity for a preliminary spheroidizing treatment and hot-rolled bar stock may be substituted.

Pearlitic form unaltered

Carbon in hot-rolled bar is in the form of lamellar pearlite, developed during air cooling from rolling temperature. Thus, for extrusions formed from this stock, annealing between processing stages is different from the process or subcritical anneal given to parts having spheroidized structures.

Heating extruded parts within or above the transformation range does not alter the pearlitic form of the carbides but merely changes their size and distribution. The hardening effect of the carbon remains unchanged and annealed hardness is then strictly a function of the recrystallized ferrite-grain structure.

As previously mentioned no initial treatment is applied to the hot-rolled stock slugs for the rocket head. Extrusion press capacities are ample enough to make a preliminary softening treatment unnecessary.

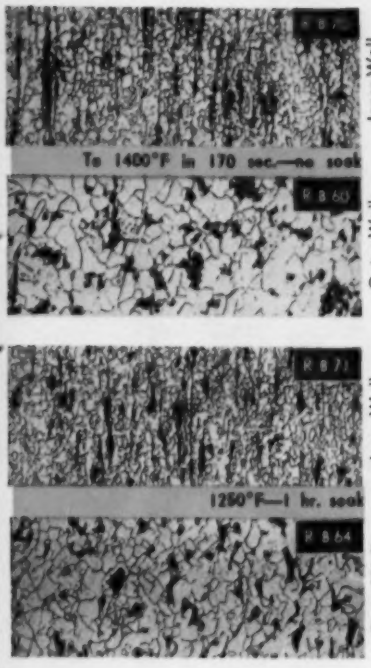


Fig. 4—Comparison of inner and outer wall grain size after a short-cycle anneal (top) and after a conventional subcritical anneal with a 1 hr. soak (bottom). All at 100X.

Other parts which may enter the production picture in Heintz' plan may have more exacting specifications for steel composition, reduction in cold extrusion and properties of finished product. But the flexible short-cycle Selas furnaces can easily meet these requirements with close control of work piece temperature and a uniform heating and cooling cycle for each and every part.

The optimum metal structure for best extrusion properties will feature even carbide distribution. "Banded" structures and local carbide concentrations are detrimental. To develop the desired homogeneous structure, two of the furnaces are designed to normalize slugs at 1750°F.

An initial normalizing treatment, applied before or after sizing, may be advantageous in some cases in promote carbide spheroidization in subsequent anneals. An originally fine lamellar pearlite will spheroidize more readily than an originally coarse lamellar pearlite (Fig. 2A). After normalizing, this coarse pearlite is converted to fine pearlite (Fig. 2B).

If the cup anneal following backward extrusion is performed at 1400°F, the fine, lamellar pearlite is converted to coarse spheroidal carbides (Fig. 2C). On the other hand, if desired properties of the finished product depend upon a pearlitic structure, the preliminary normalizing may be omitted but substituted later for the cup anneal following backward extrusion (Fig. 2D).

Conventional annealing of extruded and drawn parts employs extended soaking at a subcritical temperature, on the premise that such heat control is required to produce a uniform structure. This theory assumes that hardness and grain size variations result in varying wall thickness and impaired surface quality.

Short-cycle annealing operations at Heintz have clearly demonstrated that no benefit is derived from soaking the work-piece at annealing temperature. Metal structures and product quality are identical regardless of the time element.

Greater deformation at inner wall

Logic of this is apparent when it is considered that final annealed grain size and hardness varies primarily according to the degree of prior deformation, and, to a lesser extent, on the annealing temperature and/or time at temperature. The annealed grain is larger for lesser degrees of cold deformation.

Based on the foregoing, a uniform structure after annealing can only result when the extruded or drawn part has been uniformly deformed throughout. Such a condition rarely, if ever, occurs.

Fig. 3 illustrates the varying degree of deformation resulting in backward extrusion of the 2.75 in. rocket head. To explore the metal displacement in this operation, small holes were drilled at various locations in the surface of the sized piece and copper pins inserted 2, 4, 7, 9 of Fig. 3. After extruding, positions of the pins were observed as shown 2′, 4′, 7′, and 9′ of Fig. 3.

The photomicrographs of Fig. 3 clearly reveal the greater degree of deformation at the inner wall surface (9′) as compared with the outer wall surface (4′). By the same action, metal at the extreme mouth of the cup has received only a negligible amount of cold work.

Fig. 4 shows inner and outer wall microstructures of extruded cups after a rapid anneal with no soak and similar cups after a one hour soak at 1250°F. The structures range from a fine grain at the inner wall to a coarser grain at the outer wall. It is evident that the strucures are similar for both cycles.

This picture of metal displacement also provides a reasonable explanation for the hardness variation not totally accounted for by grain size variation. It is well known that inherent hardness increases with carbon content. The greater deformation at the inner wall area has resulted in a closer-packed arrangement of the carbides in pearlite form. This produces an effect similar to that of a higher carbon content, thereby increasing the inner wall hardness.

A structure of uniform hardness (R_B64) can be produced by short-cycle normalizing above the upper critical temperature to refine the grain and rearrange the carbides by solution and diffusion. This treatment is readily accomplished by short-cycle heating.

Diverse Properties Extend Engineering Uses of Nickel Plating

◆ Whatever the need for an engineering finish, nickel plating can usually produce the desired properties . . . Nine basic electrolytic baths, plus many others and their modifications, allow a wide selection in obtaining the required wear or corrosion resistance, ductility or hardness.

◆ Electroless nickel extends the applications further . . . Good buffability, brightness and machinability also help to make nickel a highly versatile engineering finish.

By J. B. MOHLER, Metal Finishing Consultant, New Castle, Pa.

NICKEL-PLATED DRUM for making photographic film has moderate hardness and buffability.

◆ NICKEL PLATING has virtually become an industry within an industry. Its known applications are too numerous to list and unknown applications are probably just as numerous. Its use for decorative purposes is widespread, but in addition, it imparts two basic properties —wear resistance and corrosion resistance— which account for its many engineering and industrial applications.

Nickel baths are limited to a range of conditions for chemical composition, temperature and current density. Although the conditions are sufficiently broad to be practical, they cannot be changed arbitrarily merely to favor one desired end, such as better anode solubility or higher cathode efficiency. On the other hand, properties of the deposit can be controlled for hardness or ductility by consistent use of a bath with defined limits.

There are nine recognized baths (Table I), any of which can be made up with two or three of four different chemicals. Bath No. 1 is a flash plating bath which is used only where thin, brittle deposits at a low plating rate can be justified on an economic basis. Bath No. 2 is recommended for plating wax or lead molds for electrotyping applications.

The popular Watts-type baths, Nos. 3, 4, and 5, are for plating of ductile nickel deposits. They are general purpose baths with better anode efficiency, faster deposition rates, and less peeling and cracking of the deposit than the older low-temperature lowconcentration baths. Bath No. 6 is used for deposits that are finer grained, harder, smoother and stronger than those from the Watts baths.

Where modification is desirable, bath No. 7 will result in a compromise of control problems and properties of the deposits of bath No. 6 and the Watts baths. Bath No. 8 is used for depositing hard, tough coatings, while bath No. 9 is recommended for barrel plating.

Vary conditions for close control

Variations within a recommended range are practiced for close control over the bath and the deposit. For instance, bath No. 5 may be operated at 130 to 140°F to favor faster plating and better throwing power. It may also be operated at pH 1.5 to 2.5 to favor anode corrosion.

The other extremes of these ranges will reduce corrosivity in cases where attack of the metal in contact with the solution is a problem. Final selection of the bath and range is a matter of bath control and properties desired. It is good practice to maintain control within the recommended range for consistent results.

Many other formulations are in use, but the baths listed are basic types which give a wide selection of bath behavior and deposit properties. There are wide differences in the physical properties of deposits as shown in Table II. Deposits of high hardness or high ductility can be obtained. Also, a compromise is possible where it is desired to obtain relatively good wear resistance and still retain some ductility.

Bright and semibright baths are modifications of the Watts bath, using addition agents to obtain the smoother and brighter deposits. However, addition agents result in more brittle deposits. This is not objectionable in most applications, but it is a factor in some engineering applications.

In the Watts bath, an increase in pH, increase in chloride ion and decrease in temperature will increase grain refinement and hardness. Temperature and current density are also effective in changing the properties, but the effects are not generally in a given direction. Grain refinement is associated with occlusion of basic nickel compounds or organic addition agents in the deposit. Such refinement is associated with high hardness, brittleness, high tensile strength and low ductility.

New processes extend applications

Modifications of the nickel baths are also possible by codeposition of nickel-cobalt alloys. Although the nickel baths cannot be indiscriminately changed and are limited to control ranges, the many changes that are possible favor hardness, ductility, buffability, brightness, machinability or control problems. If nickel baths are critical, they are also versatile.

By the use of nickel sulphamate, baths have been developed for many engineering applications. Characteristics of the sulphamate and Watts baths are very similar. Nickel chloride, boric acid and addition agents are used, and the bath constituents as well as the deposits respond to the variables in a manner similar to that of corresponding baths containing nickel sulphate. However, the range of usefulness of nickel deposits in engineering applications is extended since hardness values of deposits from sulphamate nickel solutions approach 600 Vhn.

Electroless nickel plating has certain advantages over the electrolytic processes and is therefore more readily applicable in many cases. Developed by the National Bureau of Standards, it is a chemical reduction process and consequently is not limited to problems of current distribution of electrolytic plating baths. Uniform coatings can be deposited on complicated shapes and internal areas difficult to reach or impractical to cover by conventional plating methods.

Deposits consist of nickel-phosphorous alloy, but their properties are similar to those of hard electrolytic nickel deposits. They have good appearance, good corrosion resistance and high hardness. As-deposited hardness

is about 500Vhn, but it can be increased several hundred points by heat treating for ½ hour at about 750°F.

Nickel deposits which are high in hardness are generally high in tensile strength and low in ductility. Tensile strength and ductility can be estimated from hardness measurements, particularly where hardness is due to bath composition rather than the use of organic addition agents.

Grain refinement, stress and brittleness are more marked in the hard baths. The same characteristics are typical of the bright baths. However, if hardness is dependent on bath composition, the properties of the deposit are controlled by maintaining the normal limits on the bath. If organic addition agents are used, the primary control is for brightness and consideration of other properties is secondary.

Although bright baths will produce hard deposits, the properties will not necessarily correspond to those obtained from deposits where grain refinement is due to bath formulation alone. Data accumulated from studies of structure and stress will serve as a guide for bath formulation and correlation of hardness with other properties. If addition agents are used for bath control, the manufacturer of these agents should be consulted.

Nickel offers range of properties

Chemical properties of nickel deposits are affected little by the structure. Because the deposits are high purity, corrosion resistance may be assumed to be high unless an alloy is formed. The possibility of obtaining better corrosion resistance by use of alloys can be determined only by testing for this property in a specific corrosive medium.

Hard deposits are desired for wear resistance. The harder the deposit the longer the wear, providing stress in the deposit or brittleness does not cause warpage or cracking during subsequent operations.

ELECTROLESS NICKEL is advantageous for plating parts with deep recesses or other area inaccessible by electrolytic plating. The deposits are uniform, hard and pore-free.

Soft deposits are desired for forming, buffability or machineability. If wear is not a primary factor, ductile deposits are usually preferred.

Tough deposits with intermediate hardness and ductility give long life and resistance to cracking due to their external stress. Such deposits are also desirable for good wear resistance, but some forming, polishing or machining may be required in the finishing operations.

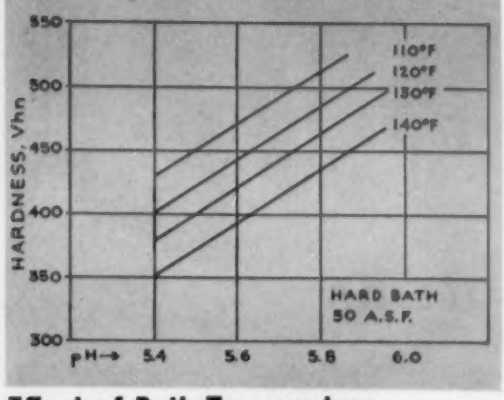
If hardness is the most important factor, measurements should be made to determine and control the hardness range. In using indenta-

TABLE I

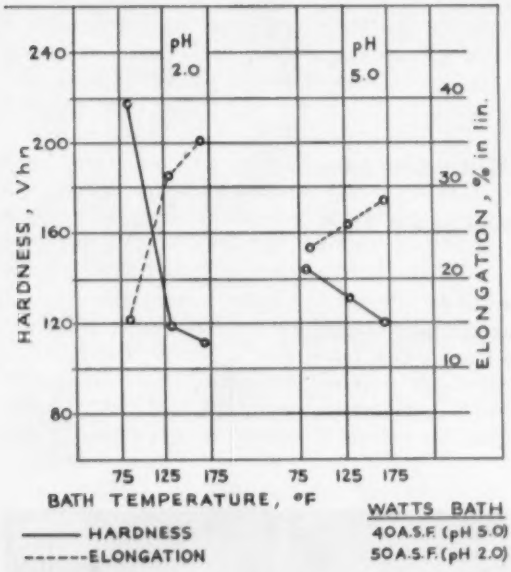
Compositions of Basic Nickel Baths

Bath No.	Nickel chloride, oz per gal	Nickel sulfate, oz per gal	Ammonium chloride, oz per gal	Boric acid, oz per gal	pH	Bath temp., °F	Current density, amp./sq. ft.
1		16	2	2	5.0–5.5	room	5–10
2		9	0.7		5.6–6.0	90	10–20
3	6	32		4	4.5–5.6	115–120	20–100
4	8	32		4	5.6–6.0	150–160	20–100
5	6	44		5	1.5–4.5	115–140	25–100
6	40			4	2	140	25–100
7	23	26		5	1.5	115	100
8		24	3	4	5.6–5.9	110–140	25–50
9		20	4	4	5.0–5.5	75–90	

Effect of pH on Hardness



Effect of Bath Temperature on Hardness



tion methods, the deposit should be at least ten times as thick as the depth of penetration of the indenter.

Ductility of deposits from Watts type baths can be estimated by a simple test. A 0.001-in. thick deposit on an unpickled nickel surface can be stripped easily. The stripped nickel sheet is then folded, creased and unfolded. If this cannot be done without the sheet breaking, brittleness is indicated. If brittleness or stress is excessive, the unbonded deposit will curl, peel and crack during plating.

In some applications, nickel plating offers a highly desirable combination of properties. For example, nickel deposits on cast iron drums for manufacturing photographic film provide surfaces with long life and high polish. Such properties are obtained by plating from a high-chloride Watts-type bath.

Chromium is commonly used for building up worn or mismachined parts because of its high hardness and excellent corrosion resistance. However, nickel is more desirable for some such applications because it can be deposited with greater uniformity and at lower cost. Also, because nickel can be machined, it is not necessary to use more expensive grinding operations.

Nickel is also used for building up surfaces where its corrosion resistance is satisfactory and very high hardness is not essential. Another use is where softer deposits are desired to avoid cracking during the finishing operations. If the surface properties of chromium are required and a relatively heavy layer is to be built up, nickel may be used for the initial buildup and chromium for the outer coating. Worn processing rolls, shafts, gears and bearing surfaces are among the parts salvaged by plating and sizing.

Reflectors, screens and small complex shapes are manufactured by electroforming. The surfaces of low-melting alloy molds, wax molds or permanent mandrels can be duplicated precisely by this method. A well-established example is that of making stamping molds for phonograph records. Corrosion resistance, wear resistance and reproducibility of the original wax surfaces are obtained by electroforming with nickel.

Electroless nickel is particularly adaptable for plating on intricate parts, in deep recesses, or where special anodes for electrolytic plating would be costly. Even though the cost of electroless nickel plating is higher than that for electrolytic plating, it is used for many engineering applications as on pump equipment, gears, tubes, hydraulic parts, piston ring grooves and jet engine parts.

TABLE II

Differences in Bath Properties

Bath No.	Hardness, Vhn	Tensile strength, psi	Elongation, % in 2 in.
5	140–160	51,000	30
6	230–260	98,900	21
8	425	152,000	6

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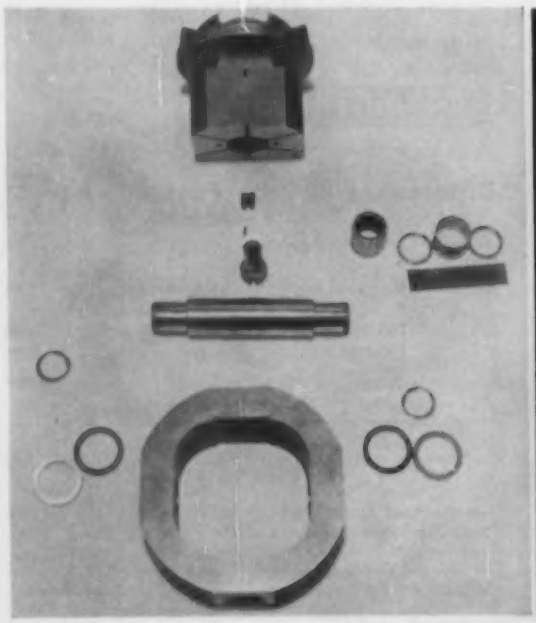
On small-diameter parts—

Unusual Fabricating Techniques Overcome Shrink Fitting Problems

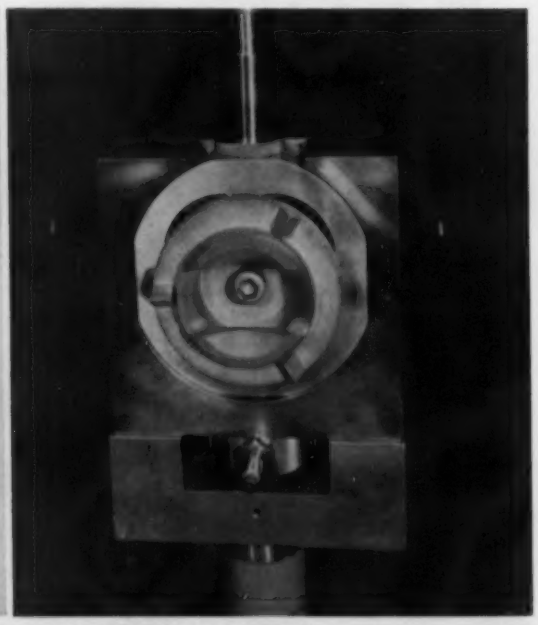
By R. G. TOWNSEND, Engineer, Manufacturing Development Unit, Knolls Atomic Power Laboratory, General Electric Co., Schenectady

◆ Inserting a 1¼ in. diam high-speed steel pin into a 6 in. diam Type 410 stainless steel ring presented a difficult shrink fitting problem at Knolls Atomic Laboratory . . . Accurately located at the center of the ring was a Type 347 stainless part with a 1-in. long hole having an interference fit of 0.002 in.

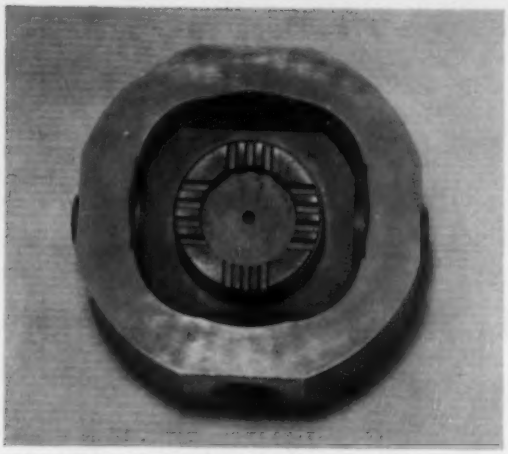
◆ The shrink fit operation was complicated by the need for careful positioning of the entire assembly . . . The method used permitted shrink fitting with consistent results to 0.002 in. per inch on a Type 347 stainless assembly.



STAINLESS steel ring and assembly components.



ASSEMBLY in jig with partially inserted dummy shaft.



SUB-ASSEMBLY with shaft shrunk into position.

♦ AN INTERESTING METHOD of shrink fitting small-diameter parts was recently developed at the Knolls Atomic Power Laboratory, Schenectady.

The problem consisted of inserting a hardened, high-speed steel pin 1¼ in. in diam into a Type 410 stainless steel ring about 6 in. in diam, with holes in either side slightly larger than the pin. A Type 347 stainless part with a hole about 1 in. long and an interference fit of 0.002 in. was located accurately at the center of the ring.

To insure uniform hole size, and proper alignment, it was necessary to line-ream the holes in the rings and center assemblies. The holes were honed to obtain a smooth sliding surface.

In addition to line-reaming, tolerances of +0.0002 and −0.0000 in. had to be maintained. This proved especially difficult on the Type 410 stainless steel rings since they had been machined from forgings which did not have sufficient dimensional stability to hold the necessary tolerances after machining.

Limit hardness to 250 Bhn

Although the Type 410 forgings had been purchased in a stress-free condition, "hogging off" the necessary stock to meet the contours of the ring placed them in such an unstable condition that they moved out of tolerance. This occurred despite the efforts of machinists to keep them cool during finish-machining.

This problem was solved by rough-machining the forgings, while leaving about 1/32 in. on all dimensions to clean up. About 0.005 in. was left in the bearing holes for honing.

The rough-machined rings were then stress-relieved for 4 hours at 1100°F in a hydrogen furnace to minimize oxidation. The forgings were then furnace-cooled. The maximum hardness was limited to 250 Bhn since Type 410 material is so sensitive to cooling rates. This made it possible to hold the necessary dimensional tolerances after final machining.

A jig was made from stainless steel which located the ring and inner assembly properly and held them in location while they were being heated. A stainless shaft, with the same coefficient of expansion as the inner part but with a diameter 0.002 in. smaller than that of the smallest hole, was inserted to assure alignment.

This whole assembly was placed in a box furnace at 400°F to increase the size of the holes. The high-speed steel shaft was cooled in liquid air at about −150°F to decrease the shaft diameter.

The first attempt to shrink-fit this assembly was done by placing the heated ring assembly into its jig under a 50-ton press. When the cold shaft was inserted into the hole, it slipped part way through, and by the time the ram came into contact with the shaft, it had seized and would not move.

To achieve uniformity, it became necessary to: (1) Perform more careful dimensional inspection of parts, (2) Use a heavier spring to prevent the stainless shaft from slipping out of position, until a pressure was put on it by inserting the hardened shaft, and (3) perform the operation more quickly to accomplish positioning of the shaft before temperature differentials had been equalized.

Obtain consistent results

It was soon apparent that the hardened shaft could best be inserted by hand, with a quick continuous motion. After these conditions had been improved, it was found possible to obtain consistently good results.

The assembly in its jig was placed in a box furnace and allowed to remain at temperature for 2 hours. The assembly was then removed from the furnace. The jig was quickly fitted to the mating part of the lower jig, which was equipped with a positive stop, to locate the position of the shaft.

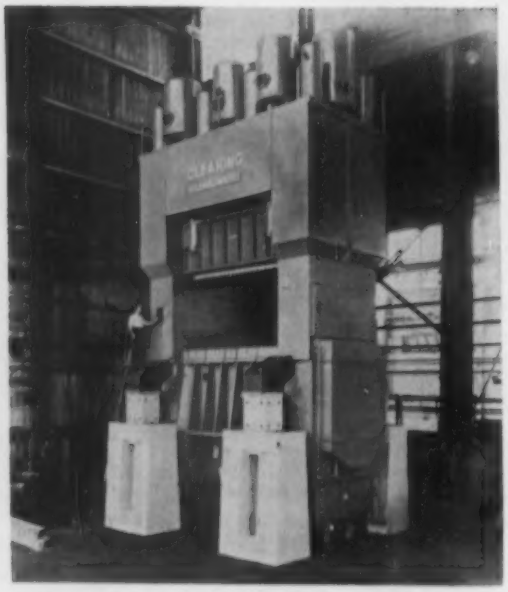
As soon as the ring assembly, in its jig, was removed from the furnace, the cold high-speed steel shaft was quickly pushed into position. This high-speed steel shaft pushed the dummy shaft out of the assembly, and the positive stop located the position of the hardened shaft.

Speed was required when inserting the cold shaft, to prevent it from freezing in the hole before it was properly located. Once the cold shaft was started into the hole, it was necessary to completely push the shaft into position within six seconds or seizing would occur.

To train an operator to perform the operation quickly and smoothly, several trial operations were necessary, using room temperature and a duplicate shaft with no interference fit.

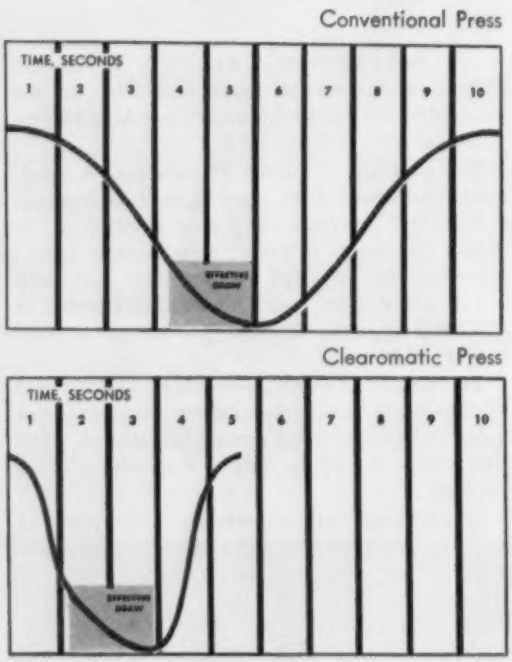
Planetary gear system—

New Press Cuts Cycling Time On Deep Drawn Stampings



PLANETARY gears in clutch system of Clearomatic press make possible faster production of deep drawn parts. Cycling time is 50 pct less.

Cycling Time Comparison



◆ FASTER PRODUCTION of deep drawn stampings is made possible by a recently developed press which speeds up the entire cycling time by means of a system of planetary gears in the press clutch.

The press, built by Clearing Machine Corp., Div. of U. S. Industries, Inc., approaches the work and returns to top stroke at an unusually high speed. The drawing portion of the stroke however, is usually slower than normal in a conventional draw press. In the Clearomatic press, non-working portions of the press cycle are accelerated in a ratio of three to one in relation to draw speed. Overall cycling time is said to be about half that of a conventional press.

Planetary gears in the clutch system make it possible to change speeds automatically without loss of flywheel energy. At the start of the press cycle, the driveshaft is driven at high speed. The ring gear, planetary gear assembly and the driveshaft rotate at fly wheel speed.

The high-speed driving unit automatically disengages and the low speed unit is engaged at a predetermined point above the work. The driveshaft is then driven at 1/3 the flywheel speed through the planetary system. Drawing is done at the desirable slow speed of the low-speed unit. To produce drawn parts of different depths, the point at which the drawing speed begins can be varied by a simple adjustment in the control system. When drawing is completed, the high-speed driving unit automatically engages, returning the slide quickly to top stroke position.

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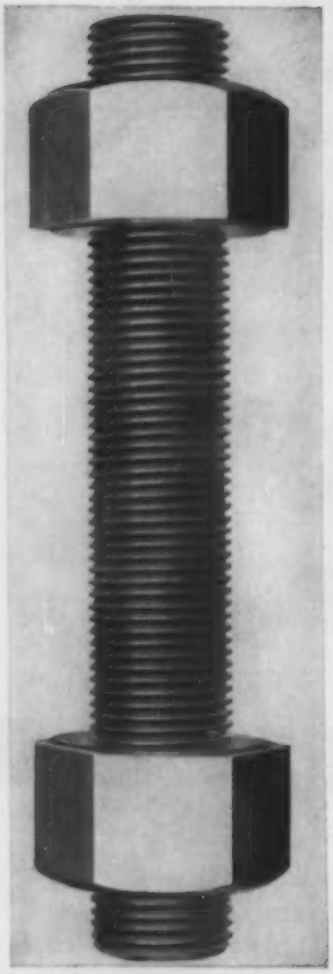

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New prices for many mill products, including the brasses, leaded brasses, nickel silvers, phosphor bronzes, copper, and other special alloys are included in this new Scovill price bulletin. Must information for all who purchase materials of this type. *Scovill Mfg. Co.*

For free copy circle No. 1 on postcard, p. 113.

Keeping posted

The many activities and interests of Air Reduction Co., Inc., are described in this new and interesting booklet, "Facts About Air Reduction." It details the products and services of the various divisions of the company. *Air Reduction Co., Inc.*

For free copy circle No. 2 on postcard, p. 113.

Cable, tube race ways

A helpful booklet on race ways designed to simplify installation of plant cable and tube systems. Provides layout notes, gives sizes and types of standard parts which are available and suggests methods of installation. Method of manufacture assures simple, uniform fitting on the job. *The Globe Co.*

For free copy circle No. 3 on postcard, p. 113.

CO_2 applications

A colorful new booklet, "CO_2: Applications Unlimited," describes the many uses industry is making of carbon dioxide. Covers a range of applications in many industries. *The Liquid Carbonic Corp.*

For free copy circle No. 4 on postcard, p. 113.

Improved valves

A new leaflet describes Atkomatic semi-direct lift valves for general purpose industrial applications with any media not harmful to bronze or 316 or 416 stainless steels. Presents information on operation and describes how a special metering disk screw eliminates water hammer. *Atkomatic Valve Co., Inc.*

For free copy circle No. 5 on postcard, p. 113.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 113.

Machine lubrication

Machine tools and light production machinery may be "push-button" lubricated with the Lincoln Multi-Luber described in bulletin 805. The device offers a low cost centralized system for controlled, automatic lubrication of stationary and motion-type bearings at the push of button while the machine is operating. *Lincoln Engineering Co.*

For free copy circle No. 6 on postcard, p. 113.

Warehouse service

The extensive warehousing and fabricating services offered by Korhumel are described in a new brochure. With sales offices in cities throughout the country, the company offers a wide range of sizes, types and gages of steel and aluminum to meet raw material needs. *Korhumel Steel & Aluminum Co.*

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Improved handling

A fully illustrated 6-page folder describes the Flow-mation system of materials handling — a new method developed to meet demands of today's automated factories. *Powell Pressed Steel Co.*

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Place bolts

An illustrated brochure explains the design and properties of Place bolts. The new slotted-type heads are illustrated and a guide chart for average Place bolt applications is included. *Cleveland Cap Screw Co.*

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FREE TECHNICAL LITERATURE

Toolroom lathes

Light-duty, economical Cincinnati Tray-Top toolroom lathes are described in this new folder. The Tray-Top lathes are built to the exacting standards of accuracy established by the National Machine Tool Builders' Assn. In addition, they offer an unusual combination of valuable design features. *Cincinnati Lathe & Tool Co.*

For free copy circle No. 10 on postcard, p. 113.

Unusual bearings

The Reali-Slim line of bearings, unique in that they combine very large diameter with very light weight, are described in Kaydon's new catalog No. 54. Industrial applications to date — in aircraft, radar, sonar, and computers—have shown these bearings answer the problem of largeness without great weight. *Kaydon Engineering Corp.*

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Welded tubing

A new 32-page handbook describes square, rectangular and special shape welded tubing. It covers the whole range of sizes, gages and tolerances on steel tubing and special cold formed shapes. *Van Huffel Tube Corp.*

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Induction heating

An 8-page bulletin (85-871) describing a complete line of induction heating equipment is available. The high-frequency motor-generator sets and associated apparatus discussed are specifically designed for induction heating operations. *Westinghouse Electric Corp.*

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Electric trucks

A 24-page catalog illustrates and describes a complete line of electric trucks. The new Raymond electric truck catalog features the firm's line of battery-powered, rider-type trucks for 6-ft aisle operation, together with attachments available for special applications. Also shown is the new Porta-dock, a 6000-lb capacity portable loading dock. *Raymond Corp.*

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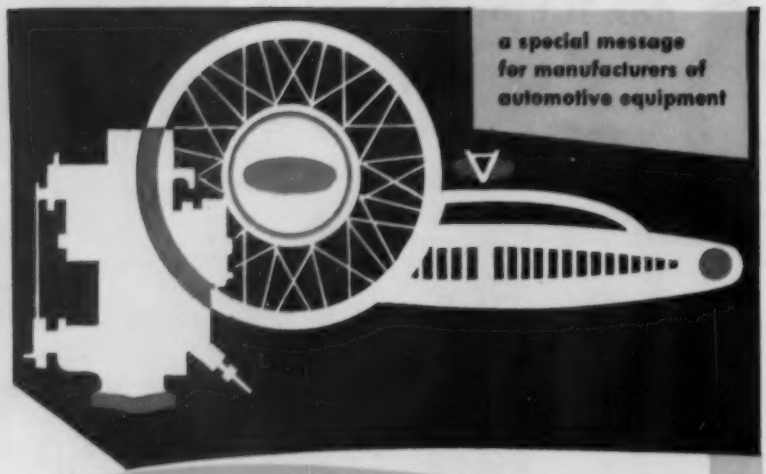

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Lock washers

By using the right type of lock washer in the assembly of your product, you can improve quality and reduce costs at the same time. Examples of proper lock washer selection are shown in a new folder. The folder also explains how a dome-type lock washer replaces a flat washer and separate lock washer with savings in assembly time, and in material costs. *Shakeproof Div., Illinois Tool Works.*

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Ni-Resist properties

Engineering properties and applications of Ni-Resist are described in Bulletin A-71. Newly-revised edition features applications of "Ni-Resist," corrosion resistant nickel alloyed cast iron, in nine specific industries as well as in general industrial uses. The 64-page booklet tabulates mechanical and physical properties offered by the eight types of Ni-Resist. *The International Nickel Co., Inc.*

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Vertical motors

An interesting multicolor bulletin, graphically illustrates the improved types of U. S. vertical solid shaft motors. It includes Unimount vertical motors in ratings from ¼ to 400 hp in grease and oil lubricated types. Cross-sectional views in full color portray design details. Many special features are presented in enlarged illustrations. *U. S. Electrical Motors, Inc.*

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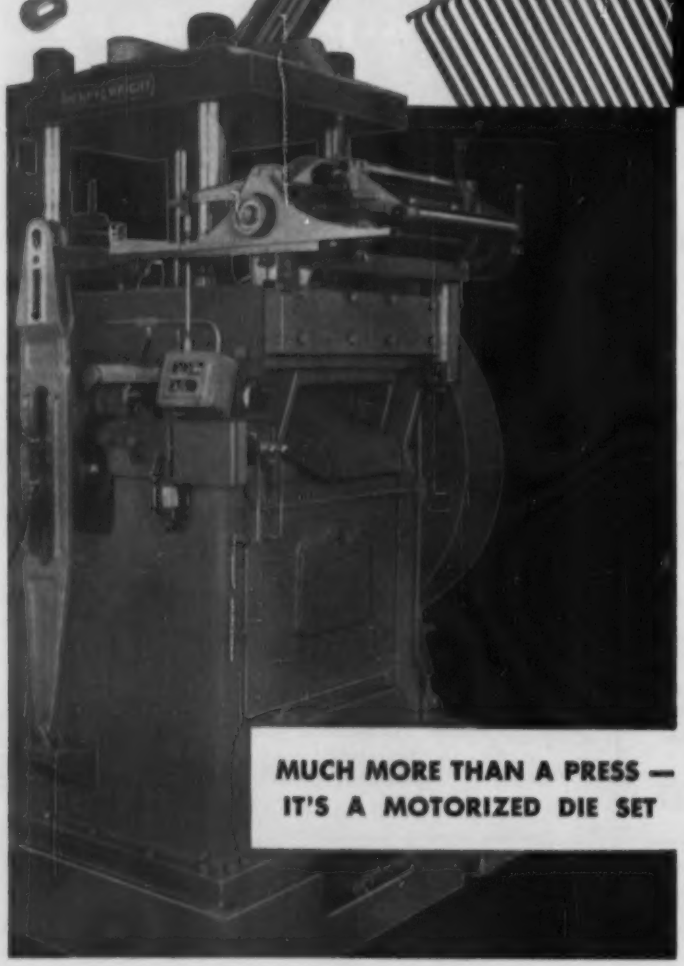

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This section starts on page 108

Nylon fasteners

This interesting leaflet on nylon fasteners describes products with many unusual applications. These light, tough fasteners are available in many standard sizes and in a variety of color. Mechanical, thermal and electrical properties are described. *Anti-Corrosive Metal Products Co., Inc.*

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Collet and chuck

A versatile production tool, the Johnal production collet chuck, is described in this new brochure. The tool is designed to incorporate the best features and advantages of the conventional collet closer, OD chuck and ID chuck in one universal tool. *Johnal Co., c/o Milman Engineering Co.*

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Master engineering manual

A new 100-page master engineering manual on multiple V drives presents a scientific and simplified method for rating V-belts. Each popular 60-cycle motor speed with complete drive selections is shown on separate pages. A table on drive selections contains nearly every possible stock sheave combination and each belt column in the table section has its own series of arc and length correction factors. Other important data considered include small diameter sheaves, centrifugal force, average hours per day operation and other factors affecting belt life. *Worthington Corp.*

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Materials handling

This comprehensive catalog, complete with diagrams and tables, explains the Stackbin system for handling and storing parts and materials. Explains how it works and how it can save you money. Describes in detail the complete line of Stackbins, Stackracks, pallets, movable bases, Stackshelves, assembly bins, nail bins and other equipment. *Stackbin Corp.*

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Jubilee tool catalog

New 464-page Starrett 75th Anniversary Catalog presents a graphic picture of the many contributions to industry made by The L. S. Starrett Co. during the past three-quarters of a century. Catalog No. 27 features 85 new tools not heretofore listed plus all other additions to the complete Starrett line. *L. S. Starrett Co.*

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Protective atmospheres

A new bulletin describes the use of protective atmospheres to prevent deterioration of metals during various heat-treating processes. Designated as GEA-5907, the 12-page publication explains the company's four basic types of gas-producing equipment which meet most protective atmosphere needs. Case histories illustrate the savings to be made in different types of jobs. *General Electric Co.*

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Circle numbers for Free Technical Literature or Information on New Equipment:

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21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

If you want more details on products advertised in this issue fill in below:

Page ..... Product .....

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Cylindrical grinding

The Landis 10-in. and 14-in. plain hydraulic cylindrical grinding machines are illustrated in detail in the company's new catalog B-54. Catalog features pressure lubricated Microsphere wheel spindle bearings. Specifications, extra equipment and typical grinding operations are included. *Landis Tool Co.*

For free copy circle No. 25 on postcard.

Special products

A wide variety of "specialty" products for production and maintenance are described in a new 6-page bulletin, "Houghton Serves the Steel Industry." For easy reference, the bulletin is divided into sections containing useful data on lubricants, packings, belting and metalworking products. *E. F. Houghton & Co.*

For free copy circle No. 26 on postcard.

Tumbling abrasive

Borolon tumbling abrasive is described in a new bulletin, ESA-236. Included is information on aluminum oxide lumps and grain for barrel finishing a wide variety of parts and materials. The abrasive is efficient for deburring, putting a radius on small parts and precision finishing. *Simonds Abrasive Co.*

For free copy circle No. 27 on postcard.

Presswork, diecasting

Hydraulic presses and diecasting machines are described in the Lake Erie Engineering Corp.'s general catalog. This basic buyer's guide incorporates a comprehensive chart relating the various types of presses to their most suitable production uses. *Lake Erie Engineering Corp.*

For free copy circle No. 28 on postcard.

Heating and swaging

Describes how full automation in loading, heating, feeding and swaging increased production as much as 300 pct and reduced operator attention required. Shows how one operator can tend several machines while production is increased from 125 to 500 units per hour. *The Fenn Mfg. Co.*

For free copy circle No. 29 on postcard.

FOR MORE LITERATURE

Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Ceramic tile adhesive

This 4-page technical data sheet covers the physical properties and installation characteristics of "3M" brand ceramic tile adhesive (CTA-12) for installing floor tile. Specifications include strength and coverage of the rubber-base adhesive, and step-by-step instructions on preparing the surface, laying the tile, and grouting are provided. *Adhesives & Coatings Div., Minnesota Mining & Mfg. Co.*

For free copy circle No. 30 on postcard.

Microhoning

Microhoned surfaces play an important part in the continued, maintenance free operation of diesel engines. This brochure describes the application of microhoning in production of parts for diesel engines. The microhoning method duplicates on every part a surface character that has the functional qualities required to carry a load with minimum wear, support a lubricating film, or hold a seal. *Micromatic Hone Corp.*

For free copy circle No. 31 on postcard.

Welding electrodes

A new bulletin W-26 describes Mang-Trode electrodes in detail. This new electrode is designed for use in the metal-arc welding of manganese bronze and the yellow brasses without preheat. The bulletin lists nine outstanding features and gives information relative to identification, core rod, chemical composition, deposit mechanical properties, current range, welding procedure. *Ampco Metal, Inc.*

For free copy circle No. 32 on postcard.

There's built-in durability in

WEIRKOTE

for all sheet-metal work

Wherever a durable zinc-coated material is needed for sheet metal fabrication, there's nothing better than Weirkote. Gutters, downspouts, ducts—no matter what the application, the name Weirkote on galvanized steel means uniformly high quality steel, tightly coated with zinc to resist cracking, peeling, flaking and corrosion. The high quality is assured by Weirton's modern mills and methods —and men.

When your specifications call for galvanized steel, call Weirton, and be sure.

Weirkote is available in coils and cut lengths: gauges 16 to 30 inclusive. Maximum width—42", maximum cut length—168". Weirkote can be obtained to fit any customer requirement. For standard roofing and siding it is guaranteed to conform to A.S.T.M. specification A361-52T.

PITTSBURGH LOCK

WEIRTON STEEL COMPANY

Weirton, West Virginia

NATIONAL STEEL CORPORATION

WEIRTON STEEL COMPANY

THE
Number One Name
In Socket Screws & Keys
ALLEN

Don't take it for granted that any hex socket screw is an Allen. Your Allen Distributor *alone* can offer you

1. **ALLENPOINT SET SCREWS** with the new smaller point — proved by impartial laboratory tests to have greater locking power and vibration resistance, plus uniformly high shaft holding power, compared with conventional cup point screws and those with serrated or angled points.
2. **LEADER POINT CAP SCREWS,** for substantially reduced chance of thread injury or damage to threaded holes.
3. **ALLENOY STEEL** — with the strength and temper to permit the use of smaller sizes, and make button head and flat head screws practical despite necessarily shallower sockets.
4. **ALLEN PROGRESSIVE PRESSUR-FORMING,** producing contoured uncut fiber flow, from head to point. A process originated and perfected by Allen.

Be sure to get Allens in the black and silver striped box, sold only through leading Industrial Distributors. Write us for technical information.

ALLEN
MANUFACTURING COMPANY
Hartford 2, Connecticut, U.S.A.

DISPLAYS: Roll Them Out

Valuable engineering time can be saved with roll-away type display racks . . . Can be used for drawings, maps, small parts and charts . . . May be mounted against wall or on casters.

An unusually flexible method of filing and displaying engineering drawings, maps, small parts and business charts has attracted considerable attention in Detroit.

The new display and storage racks are built by Inter-Lakes Engineering Co., 4843 Bellevue, Detroit, as a simple and practical method for storing and displaying large and medium size progress charts and factory records including metal templets.

Charts Are Suspended

The Roll-A-Way system consists essentially of a welded steel rack with a number of parallel tracks. Drawings or charts are suspended by means of roll hangers.

The rack is twice as long as the layouts or drawings so that the drawing desired can be rolled out quickly from its filing place to the other end of the tracks where it is out in full view.

Racks Hold Displays

The rack can be built to accommodate as many display boards as desired. The tracks can be spaced an inch or more apart, depending on the type of material.

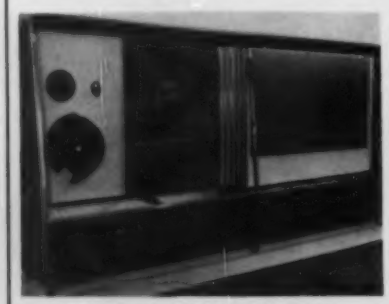
Display material may range from thin metal plates to maps, drawings or small parts mounted on Celotex or Masonite.

Length of the rack can be selected to fit the size of the layout. The display racks can be mounted against the wall or attached to caster-equipped standards and moved from place to place.

Use at Meetings

The flexibility of the display racks makes them particularly suited for showing charts or graphs at sales meetings, according to the manufacturer. Provision has been made for fluorescent lighting in the case of permanent installations.

The new racks are being considered, it is understood, for displaying 15 ft long, full size metal body plates used by the automobile industry.



Rolls out quickly . . .

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Galvanizing:

New plant features improved finishing methods.

A modern annex has been added to the fence mill of The Colorado Fuel and Iron Corp.'s Wickwire Spencer Steel plant at Buffalo. The new structure is 105 ft by 40 ft, and houses chain link fence galvanizing facilities for improved methods of handling, storing, processing, and loading Realock fence.

Features include modern con-

trols for temperatures at the flux and zinc baths, improved take-up methods to eliminate old style handling, and an improved ventilating system that makes a complete change of air in the galvanizing room once every two minutes.

Purchasing:

Guide aids in buying screw machine products.

Factors which will produce maximum economy when designing and specifying screw machine products are detailed in a report issued by the National Screw Machine Products Assn. Designed to aid both design engineers and purchasing agents, the report covers the 23 most important considerations and those most commonly overlooked in the ordering of such products.

Design Is Important

Factors of design comprise the largest group of recommendations, but, the Association points out, the relative importance of each consideration is not reflected by its sequence in the report. Also, not all are expected to be applicable to all prospective purchasers, although for repetitive buyers of screw machine products, the vast majority of the points listed will apply over a period of time.

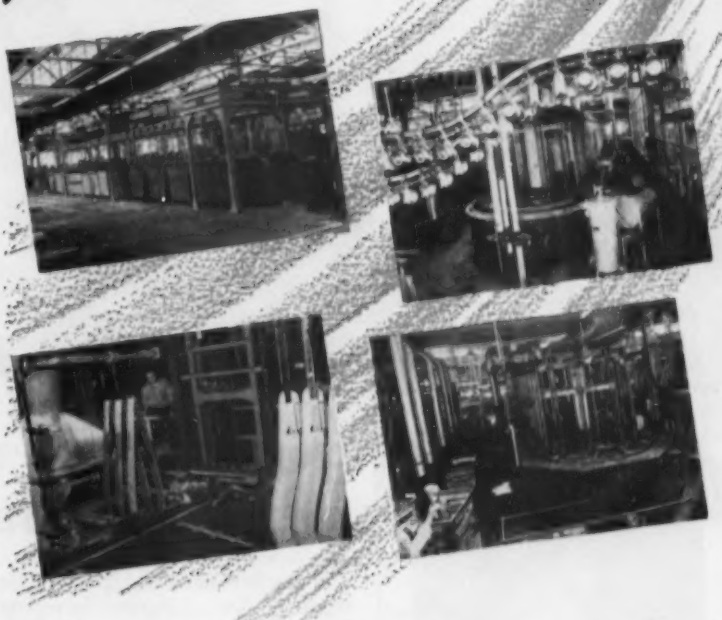
How Report Was Made

Failure to follow those recommendations now given by the Association, has in the past, meant unnecessarily higher costs and often delays in receiving goods. The information contained in the report was obtained by questioning the 280 members of the Association who produce approximately 70 pct of all screw machine products manufactured by independent concerns.

The Association breaks down its recommendations in two sections: first to design engineers and production personnel; the second, more specifically to purchasing agents. However, it points out that familiarity with all points listed will promote a better understanding of the basic problems and insure

MEAKER

Automation...



The Key to Successful High Speed PLATING

- Higher Production
- Versatility
- Economical Operation
- Better Finish

Automation by MEAKER is the sure way to more successful plating, anodizing, phosphatizing and other processing operations — at higher speeds — thus lower cost. MEAKER builds automatic plating equipment especially to fit your operation, whatever it may be.

Let us know about your problem and ask to have a MEAKER engineer study it and make recommendations at no obligation.

THE MEAKER COMPANY
1631 SOUTH 55th AVENUE • CHICAGO 50, ILLINOIS
Phone OLympic 2-2110

DeVilbiss semiautomatic spray equipment saves paint, gives better finishes to Royal thermic jugs, at Royal Manufacturing Company, Bowling Green, Ohio.

Royal goes automatic to save paint . . . get better finishes

D. W. Bolton, president of Royal Manufacturing Company, inspects finishes applied by DeVilbiss semiautomatic spray equipment. Royal makes one- and two-gallon jugs.

The Royal Manufacturing Co., Bowling Green, Ohio, had a problem. Their Royal thermic jugs required a high-quality hammered finish of synthetic enamel, yet manual spraying allowed too many variables in the delicate operation for their quality standards.

Royal solved its problems by installing DeVilbiss Automatic Spray Guns in a semiautomatic setup. The film thickness applied, the wetness of coat, the degree of atomization – all are precisely controlled. Result: uniform hammered finishes of lasting beauty.

Furthermore, the speed and precision of the new DeVilbiss semiautomatic system have enabled Royal to step up production, increase paint mileage (from 650 to 1,100 jugs), reduce operator fatigue and rejects.

Says Royal's president, D. W. Bolton, "DeVilbiss semiautomatic equipment gives us a foolproof finishing setup." Royal now uses DeVilbiss throughout its finishing department: spray guns, compressors, spray booth, transformer, hose and hose cleaner.

Could you speed output and get better finishes at lower cost with DeVilbiss semiautomatic equipment in *your* paint department? Let a skilled DeVilbiss engineer survey your finishing operation and give you a full report. For complete information, contact your local DeVilbiss jobber or branch office, or write us direct.

THE DEVILBISS COMPANY

Toledo, Ohio

Santa Clara, Calif. • Barrie, Ontario • London, England

Branch Offices and Distributors in Principal Cities Throughout the U. S., Canada and the World

FOR BETTER SERVICE, BUY

DEVILBISS

SPRAY GUNS • AIR COMPRESSORS • HOSE AND HOSE CONNECTIONS • SPRAY BOOTHS

Design should take advantage of standard bar and tube sizes and shapes for low cost . . .

proper cooperation between suppliers and customers.

Designers should design the product so that where possible, standard sizes and shapes of tubes or bars, commonly used in the screw machine process, may be specified. Rounds, squares and hexagons are typical of standard shapes. But there are also other pre-shaped forms of bar stocks, even suitable as semi-formed fear teeth for example, that are available without special order.

Avoid unnecessary fancy horizontal shapes in the design of the final product unless absolutely necessary. This also runs up production costs and is not justified unless some useful or ornamental objective is served. Avoid square bottom holes unless absolutely necessary. They are expensive in any manufacturing process.

Bevel Edges

Allow sufficient depth of blind holes to permit clearance of metal chips produced in grinding or thread cutting. Sharp outside corners should not be specified unless absolutely necessary. They can increase the costs of manufacturing and are more subject to shipping damage and expense. A bevel edge or countersink is preferable. If it is permissible to remove corners, the limits should be specified.

Overly sharp inside corners should also be eliminated unless their importance outweighs added production cost. Frequently a chamfered corner not only saves costs but also increases the product's strength, yet has no functional effect. Also, in some cases, undercutting at the angle point may permit the same function as a square corner, at a lower cost. Usually an undercut has no important effect upon either the strength of the part or the effectiveness of the bearing surfaces.

Avoid non-standard threads and special diameter holes. These require special tools and special gages, both items of extra production cost. Avoid excessively close tolerances where possible. These entail extra supervision, more expensive tooling, and frequent tool and machine adjustments. Excessively small tolerances simply represent an unnecessary expense.

Don't demand removal of burrs unless essential. Sometimes it is desirable to have outside burrs removed when inside burrs can remain, and vice versa. For some purposes, however, burrs are of no consequence. Also, the removal of tool marks is not always necessary and usually involves additional cost.

Watch Hole Location

Don't require that holes be precisely located when they have no definite relation to keyways or other functions. Special jigs and fixtures are necessary when precision is required. When chamfering a corner, a larger chamfer is preferable, to eliminate additional necessary machining. In countersinking, especially a threaded surface, a broad angle is less likely to cause imperfections.

If knurls are required, request only an approximate number; this permits a less expensive automatic process. Although it may yield 29 points instead of 30, such a difference is often trivial.

Don't specify threads all the way to a shoulder. When a diameter surface is not required to fit another part, it is usually best to specify the diameter in fractions of an inch. Then the part can be made from standard size materials, and the fractional dimension, instead of decimal, will indicate a close tolerance is unnecessary.

In specifying materials, choose those with maximum machinability within the range of strength requirements. Excessively hard materials are normally more expensive and increase machining costs.

Don't require super-smooth finishes that are unimportant. A

Want more air for your money?

Check valve *on DeVilbiss compressor outfits securely seals air in tank. Manifold is finned for additional after-cooling; provides mounting for pressure switch, eliminating piping and additional tank openings.*

If you're losing on power, upkeep and depreciation, then it will pay you to replace your old air compressor with a new DeVilbiss outfit. By actual tests, you'll get as much as 22.6% more air per power dollar. DeVilbiss efficiency means high *actual delivery.*

In addition to check valves, every DeVilbiss compressor includes: A.S.M.E. approved tank, automatic pressure switch, diamond-bored pistons, cylinder head with removable valves, quality electric motor or gas engine.

Contact your local DeVilbiss jobber for help in analyzing your compressed air problems.

THE DEVILBISS COMPANY
Toledo, Ohio
Santa Clara, Calif. • Barrie, Ontario
London, England
Branch Offices in Principal Cities

FOR BETTER SERVICE, BUY
DEVILBISS

Palm Coated with Plastic: This No. 30 Monkey Grip outwears canvas as much as 10 to 1, fits better, grips better.

Costs 40% to 70% less to protect hands with palm-coated gloves

Coated palms outwear canvas or leather palms. Fabric backs give comfortable ventilation.

NEOX No. 93

Handling sharp-edged materials, wet or dry: Palm-coated with NEOX (specially reinforced neoprene) which is unequalled for resistance to cutting and puncturing and does not absorb grease or oil. Job-fitted for handling such materials as strip and sheet metal.

Grappler No. 362

Handling abrasive materials, wet or dry: This Grappler glove is palm-coated with DUROX, a leather-like plastic that outwears ordinary plastics 50% and retains its grip when wet. Band top and knitwrist styles are also available in regular plastic coating. All Edmont plastic coated gloves have wing thumbs and best fit of any coated work gloves.

Grab-it No. 47-W

Handling sharp, abrasive or slippery materials, non-oily: Grab-it type, palm-coated with rough-textured natural rubber which has remarkable non-slip grip, as well as long-wearing qualities on rough work. Available in knitwrist style, also.

Free Test Offer to Employers: Send brief description of your operation, materials handled and temperature condition. We will recommend the glove (palm-coated or fully coated) that best fits your application, and forward samples free of cost, for testing on-the-job. Our laboratory also develops special gloves for special applications.

Edmont Manufacturing Company, 1234 Walnut Street, Coshocton, Ohio

World's largest maker of coated industrial gloves, available through all leading industrial suppliers.

Edmont job-fitted gloves

hidden part, a part not involving a friction factor, or an exposed part whose appearance is immaterial, may as easily be left rough, at a considerable cost savings. As a natural process sequence, most screw machine products are machined beyond maximum requirements.

Be Specific on Tests

Be specific about hardness tests if required, also testing of elongation or binding. By naming the testing method and the physical properties desired, it's possible to avoid costly confusion as to exactly what is desired.

If the buyer is to heat treat or plate, dimensions should be given prior to finishing. If the supplier however, will heat treat or plate, dimensions should be shown after heat treating or plating. Plating thickness should also be given. In addition, special pitch diameters before plating require special gages and are costly. For plating threaded parts, specify unified thread standards to take advantage of standard gages which will allow for addition of plate.

Where Redesign Pays Off

Avoid concentricity where possible. Where it is essential to proper function however, it should be shown in terms of total dial indicator reading, and the point of measurement clearly shown on the blueprint.

Unnecessary second operations are normally more expensive than automatic screw machine operations and should be avoided. Often, the redesigning of a product eliminates a second process by combining it with the original machine operation.

Order Large Quantities

Because producers of screw machine products generally work from fixed quantities of raw materials, there is often a price advantage for the purchaser of the final product if he allows elasticity in his order size. This is due to the variations in the length of bar stock as obtained from the mills.

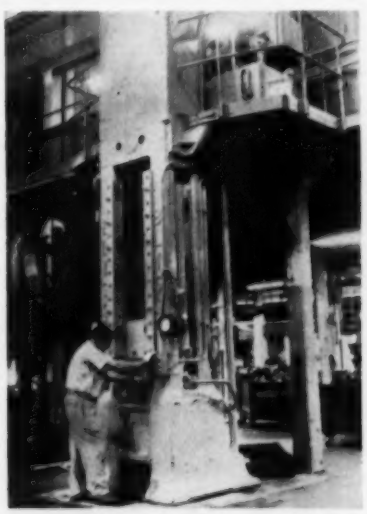
Variations in scrapped quantities

during manufacture may cause actual output slightly over or under the estimated total. Thus, the customer, by agreeing to accept 10 pct more or less than the quantity ordered, can benefit, so state ordered quantity accordingly.

Another major potential item in cost-saving is the elimination of orders in very small quantities. Machine set-up, tools, and other overhead naturally average higher per product unit when apportioned to a short run. Thus, if the parts ordered are standard, it is wise to order as large a quantity as possible; often, the inventory increase is not as great as the extra cost of the smaller quantity.

Allow Delivery Time

A sufficient allowance should be made for deliveries. It may be necessary to design, order, and make new tools, and time may be required to obtain materials and set up machines. Consideration should be given to the fact too, that machines are not always immediately available. As in any business, rush orders are more expensive to fill. There is usually a price advantage to placing orders that permit a back-log and stable operations.



LONG STROKE press uses 20 by 21 in. floor space, takes up to a 60 in. stroke. This Bliss Hydro-Dynamic press was recently installed at Worcester Pressed Steel Co., Worcester, Mass.

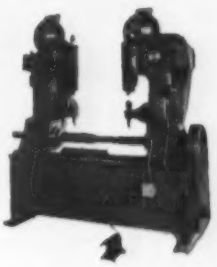
Save Labor... cut costs with

FASTER Riveting and Clinching!

T-J

RIVITORS

T-J RIVITOR used for automotive clutch plate assembly. Saves time and labor doing a four-fold job—assembling, setting, inspecting and ejecting.



DOUBLE RIVITOR sets two rivets at a time! Equipped with 10" hoppers, and tooled to automatically feed and set two ¼" dia. x ⅝" long wagon box head rivets at a time in elevator chain and raddle or elevator flight assemblies for farm implements. Controlled by one foot pedal.

CLINCHORS

T-J CLINCHOR . . . one of six special 8" throat Underfeed Clinchors used by a large automotive body manufacturer. Feeds and sets 11/16" square cased nuts in outside quarter panels, left and right hand.

DOUBLE CLINCHOR sets two nuts at once! Tooled to feed and set ¾" x ½" x 1/16" thick Fabri-Steel nuts at each operation. Both Clinchors tripped by same foot-operated valve. Adaptable to wide range of clinch nut setting problems.

Automatic Feeding and Setting!

T-J meets your needs for labor saving SPEED in assembly . . . with performance-proved Rivitors and Clinchors for many jobs today . . . in aircraft, automotive, farm machinery, stampings of all kinds.

T-J CLINCHORS set clinch nuts 3 to 5 times faster! Fully automatic . . . controlled by a single foot pedal! Available in Underfeed and Gravity feed models, throat depths 8" to 36".

T-J RIVITORS automatically feed and set solid rivets . . . with high production! Electrically powered Rivitor sets 1/16" to ¼" diam. solid steel rivets up to ⅞" long. Air-powered Rivitor sets aluminum alloy rivets up to ¼" diam. or steel rivets up to ⅜" diam. and up to ¾" long. Throat depths 8" to 36".

Write for Clinchor bulletin 847; Rivitor bulletins 646 and 847. The Tomkins-Johnson Co., Jackson, Mich.

38 YEARS EXPERIENCE T-J

TOMKINS-JOHNSON

RIVITORS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHORS

NOW! GRAND RAPIDS UNIVERSAL CUTTER AND TOOL GRINDERS

are on improved delivery schedules

It's true, they have been hard to get because every model offers extra value.

The Model 62, for instance, features four-speed spindle drive, universal positioning of elevating hand wheel, anti-friction ways, more vertical capacity, longer swing, one-shot lubrication system.

The many other Grand Rapids Cutter Grinders are also on improved delivery schedules. Send coupon for complete information.

• *GET THE FULL STORY ON ALL THE ADVANTAGES*

GALLMEYER & LIVINGSTON

GALLMEYER & LIVINGSTON CO.
400 Straight Ave., Grand Rapids, Mich.
Please send me the following literature without obligation:
☐ Cutter and Grinder Literature
☐ Surface Grinder Literature

NAME
POSITION
FIRM
FIRM ADDRESS

We'll answer within twenty-four hours

Machining:

Bar knobs speed fixturing, improve boring accuracy.

Mounting and removal of workpieces from a precision fixture on a special boring machine has been greatly facilitated at Austin-Western Co., Aurora, Ill., by the use of bar knobs made by West Point Mfg. Co., Detroit.

Austin-Western is a large producer of heavy road grading and construction equipment and manufactures most components used in its own shops. One job which requires great accuracy is the machining of power takeoffs and transmission housings for hydraulic cranes. Demands on equipment of this type make accurate machining especially important.

Must Fit Precisely

A special Sundstrand four spindle boring machine is used to bore four holes in five different workpieces, 2 transmissions and 3 power takeoffs. The maximum tolerance on the holes bored is 0.00175 in.

Because the transmission housings and power takeoffs must fit together precisely in assembly the fixture on which they are bored is fitted with precision machined locating surfaces and the result is exact alignment of the two pieces.

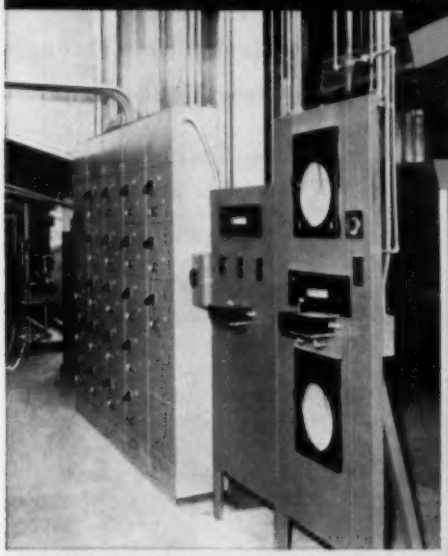
Permit Rapid Handling

The bar knobs contribute to rapid handling and accuracy because they permit rapid setup and removal of the workpiece while providing strong and secure clamping. The bar knob has been designed so that no special tool is required, any

Knobs hold tight . . .

COMPLETE *Finishing* SYSTEMS

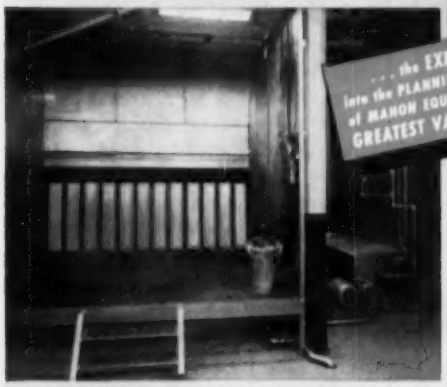
. . . for ENAMELS • LACQUER • PAINT • VARNISH



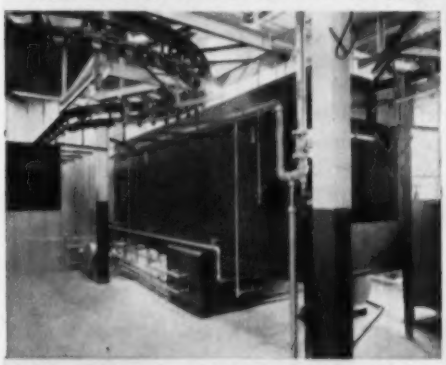
Control Station for the Complete Mahon Finishing System. All Starters and Electrical Controls are by General Electric Co.

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

View inside the enclosure which houses the Complete Mahon Finishing System installed in the General Purpose Control Department of the General Electric Plant, Bloomington, Illinois.



Mahon Open-Face Hydro-Filter Spray Booth designed to meet specific painting requirements of certain products in the General Purpose Control Department of the General Electric Company.



Mahon Flow-Coater and exit end of ventilated Flash-Off Area and Drip Zone. Part of the conveyorized system at General Electric.

GENERAL ELECTRIC CONTROL ENCLOSURES are Painted in a COMPLETE MAHON FINISHING SYSTEM!

Products of the General Purpose Control Department of General Electric Company, Bloomington, Illinois, now receive their fine finish in a completely new, highly efficient Mahon Finishing System. Facilities are provided for both continuous conveyorized processing and painting of normal units and individual handling of larger units. The continuous processing system includes a Five-Stage Metal Cleaning and Rust Proofing Machine, Dry-Off Oven, Cooling Tunnel, Flow-Coater, Flash-Off and Drip Zone Enclosure, and a Finish Baking Oven. Both Ovens and the Cooling Tunnel are located overhead. In addition to the conveyorized system, a Two-Stage Metal Washing Machine was provided together with an Open-Face Hydro-Filter Spray Booth and a Batch-Type Finish Baking Oven to handle unusually large units. Other equipment includes a Filtered Air Supply System and Stripping Facilities. The entire system is modern in every respect and is engineered into a surprisingly small area of floor space. If you are contemplating new finishing equipment, you, too, will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning, coordinating and engineering of equipment—which is the key to fine finishes at minimum cost. You will find also, that Mahon equipment is built better by Mahon for more economical operation over a longer period of time—a point which should receive your careful consideration when comparing initial costs. See Sweet's Plant Engineering File for information, or write for Catalog A-655.

THE R. C. MAHON COMPANY

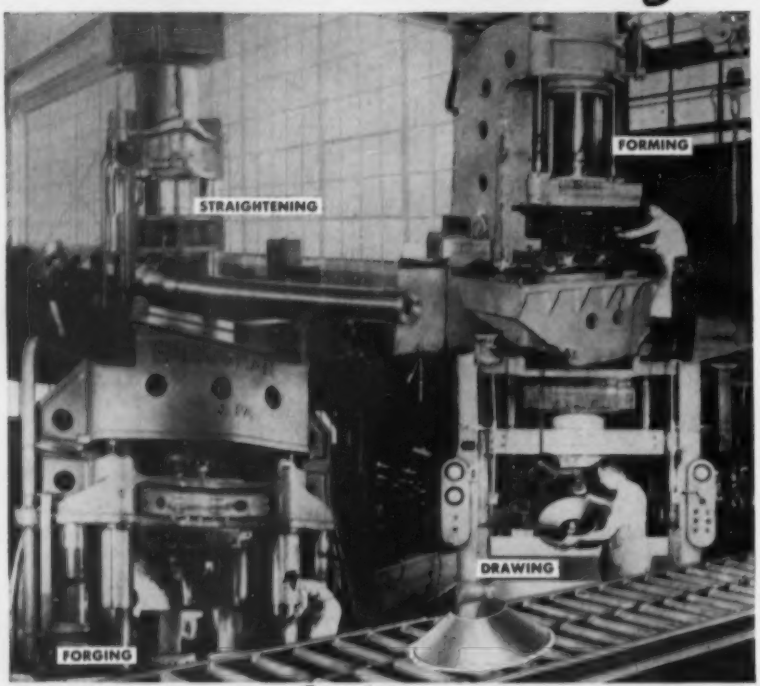
HOME OFFICE and PLANT, Detroit 34, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems and Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

Farquhar HYDRAULIC PRESSES

Eliminate Metal Cutting



Write for a copy of *Farquhar's* fact-packed Bulletin HP-49

CHIP MAKING IS COSTLY

Metal formed to size and shape eliminates long costly machining operations. These are typical examples of the broad range of *Farquhar* presses that form metal to shape and eliminate costly metal-cutting. They're fast, sturdy, and efficient . . . a wise investment for cost-conscious manufacturers. Farquhar's engineers will be glad to work with you on your metal-forming problems.

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THE OLIVER CORPORATION — Farquhar

A. B. FARQUHAR DIVISION

THE OLIVER CORPORATION, 1503 Duke St., York, Pa.

First saving is in fixture design time through use of templets . . .

piece of steel bar stock can be used to tighten the knob.

Bar knobs used on this fixture are only one item of a considerable number of Wespo standard component parts which Austin-Western uses for production of jigs and fixtures. Analysis by their engineering and purchasing departments has revealed a threefold saving in the purchase of component parts of fixtures. While it is true that these savings are difficult to assess in exact terms of dollars and cents, they are of considerable importance.

Use Templets for Designing

The first saving is in fixture design time, where the draftsmen can use templets of standard parts and trace them in on the drawing so that there is no need to detail the part. The second saving is in the elimination of toolmaker expensive time to make clamps, hand knobs and similar simple components which can be purchased.

Replace From Stock

Because suppliers produce these parts on a mass production basis their cost is considerably lower than that of producing them in the toolroom. The third, no less important saving is in maintenance and repair of fixtures which is simplified by the availability of these component parts in stock.

When there is damage or wear to a standard part on a fixture it is an easy matter to draw the part from stock and replace it, rather than to have it machined. The latter course could result in considerable downtime for the fixture.

Reduces Tooling Costs

Many manufacturing firms have adopted the policy of buying as many standard component parts for tooling and production as possible. The availability of these parts is a definite factor in reducing tooling costs.

Fasteners:

High strength titanium tension bolts developed.

Titanium bolts offering performance comparable to that of high-strength aircraft bolts are now being produced for the aircraft industry by Standard Pressed Steel Co., Jenkintown, Pa.

Development of a successful titanium tension bolt is the result of a 30-month research program. Production bolts have been shipped to the Aircraft Production Resources Agency at Wright-Patterson Air Force Base, to the Navy's Bureau of Aeronautics and to 18 leading airframe and aircraft engine manufacturers in the United States and Canada.

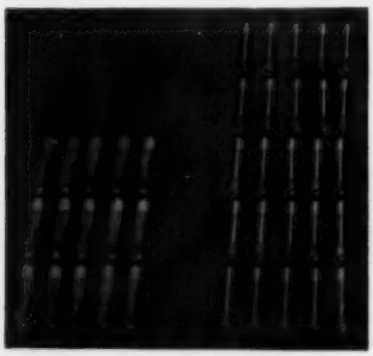
Several Problems Solved

Weighing only 57 pct as much as a similar steel bolt, part-for-part substitution of titanium for steel bolts in critical tension applications on aircraft is believed possible—with considerable saving in weight.

An important factor in development of the titanium bolt was solution of the titanium fatigue problem. Lessons learned here indicate the information may be applied to advantage in all fields. The titanium bolts are fabricated from an alloy containing 4 pct aluminum and 4 pct manganese.

Finer Surface Finishes

Methods evolved during the program open up new approaches to the fabrication not only of tita-



Titanium aircraft bolts . . .

COMPONENT FABRICATION

by KIRK AND BLUM

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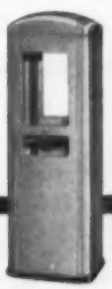
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SHEET METAL FABRICATION

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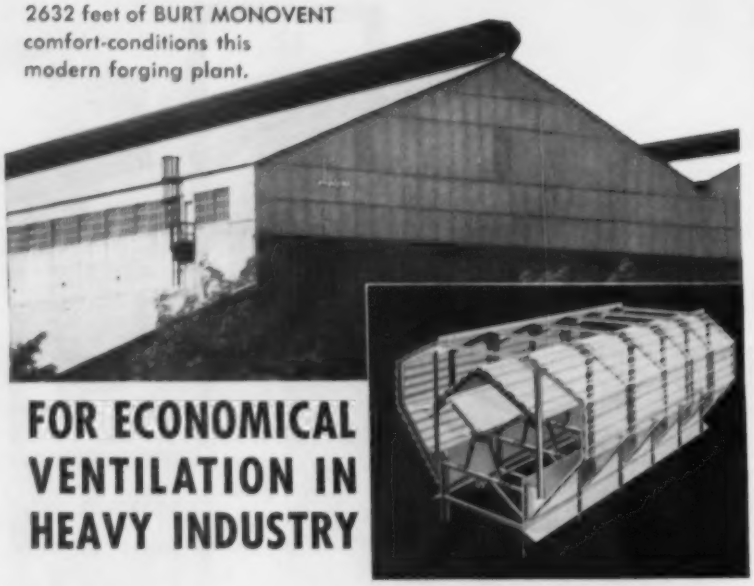

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Continuous Ridge Ventilator Is Your *BEST* Buy!

Where high heat or fumes require the removal of large volumes of air, Burt Monovent exhausts more air per dollar than any other ventilator. It provides uniform ventilation of the entire structure— in effect, converts the roof ridge to a quick-acting giant air valve. The Monovent is economical to install, operate and maintain and highly efficient.

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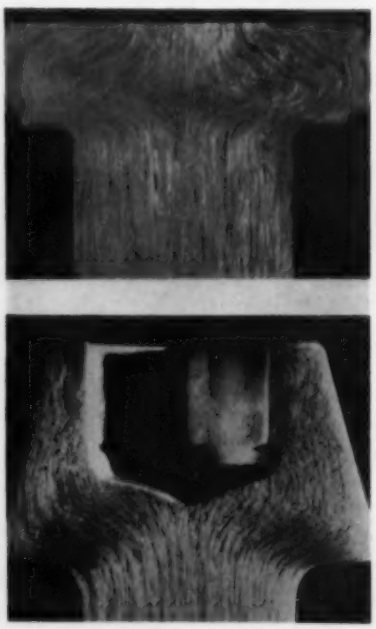
nium bolts but also of higher tensile strength steel bolts. A new method of forming threads was developed. To overcome the fatigue problem it was also necessary to develop a production method for obtaining titanium surface finishes finer than 8 microinches. This compares with 30 microinches or more for present-day high-strength steel bolts.

Design Improved

Titanium is notoriously notch sensitive. That is, it is weakened structurally by surface irregularities or notches—all out of proportion to the magnitude of the notch. The effect is greatly aggravated under dynamic loading with resulting loss in fatigue strength.

SPS early realized that the drawback was a serious one since the threads of a bolt as well as the junction of head and shank presented natural notches that could not be eliminated—but had to be strengthened through proper design and fabrication.

The problem proved even more acute when it was found that notch sensitivity in titanium extended to the very surface finish of the metal. Finishes considered



Flow lines important . . .

extremely smooth for steel bolts proved completely inadequate for a titanium tension fatigue bolt. Failures were often traced to previously undetected, microscopic surface flaws.

Ductility A Factor

A theory developed at SPS holds that the extreme notch sensitivity of titanium can be traced to its ductility. Titanium has a modulus of elasticity half that of steel and as a result stretches twice as much under a given load. The additional stretching tends to widen surface cracks more rapidly and hence weaken the metal.

It was found that titanium could be hot forged—but only within a critical temperature range and with special tooling, special heating equipment and advanced forging techniques. The process had to be closely controlled to keep the flowing metal from developing localized hot spots. It was found that internal heat generated by the forging process could produce troublesome grain coarsening with resulting loss in strength.

Fuel:

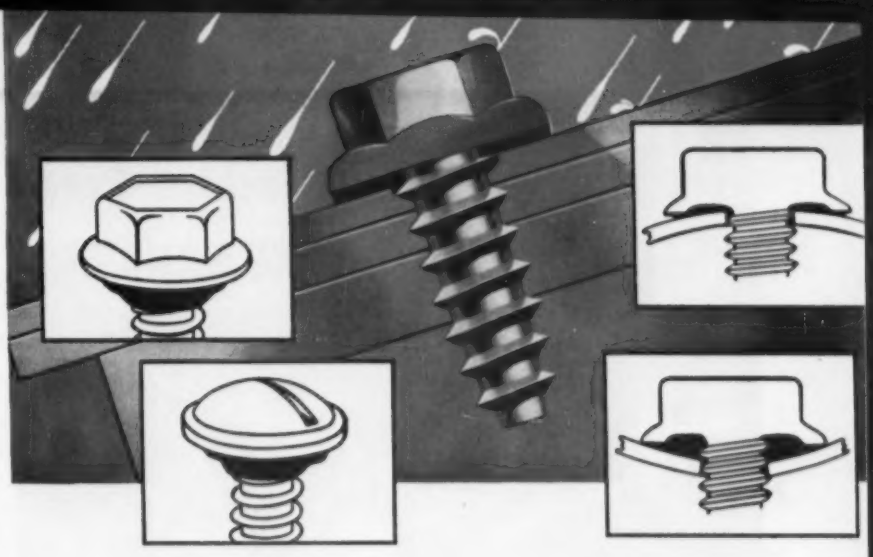
Centrifuge converts heavy oil for diesel use.

A new purifier cleaning technique, which cuts down-time at least 60 pct, now makes possible increased use of low-cost heavy oil as diesel fuel.

Developed by Westfalia Separator engineers, Englewood, N. J., the centrifugal separators are equipped with auxiliary cleaning equipment, a hydraulic lifter for the upper bowl assembly and disk set, and exchangeable bowl liners to catch sludge. Both Westfalia MOC and OG oil separator lines, especially designed for heavy oil processing, are available with the lifter and liners.

Costs Have Jumped

Because the cost of regular distillate diesel fuel has increased so rapidly in the last decade, economics of diesel operation dictate



New *Tuff-Tite** Fastener Prevents Leaks— Protects Surface—Absorbs Shock—Stops Squeaks

Tuff-Tite is a new multi-purpose fastener with a one-piece metal head and assembled neoprene washer that gives you quick, secure, economical, leakproof fastening of metals and plastics.

Use of Townsend's Tuff-Tite makes possible watertight fastening of galvanized steel, protected metal, stainless steel, aluminum, plastic and other roofing and siding materials at substantial savings over conventional fasteners.

Leaks between the head of the screw and the metal washer are impossible because they are made as one piece. When this fastener is tightened, the pre-assembled neoprene washer is trapped and controlled by an undercut in the washer head. The neoprene is forced into the hole and around the threads to form a watertight and airtight seal.

Tuff-Tite fasteners provide surface protection in assembly of appliances and similar products. The neoprene washer provides a cushion that permits tight seating without cracking or chipping porcelain enamel and other fine finishes.

Where vibration noise is a problem in automobiles, railroad passenger cars and machinery, the cast neoprene washer on Tuff-Tite fasteners acts as a shock absorber—eliminates squeaks and chatter.

Tuff-Tite fasteners are available as self-tapping screws, thread cutting screws, drive screws, machine screws, stove bolts, wood screws, nails and special products. They are made of carbon, alloy and stainless steel, aluminum, copper and other metals in a variety of head styles.

To learn more about how Tuff-Tite can increase your fastening efficiency—improve your products, use the coupon below or write.

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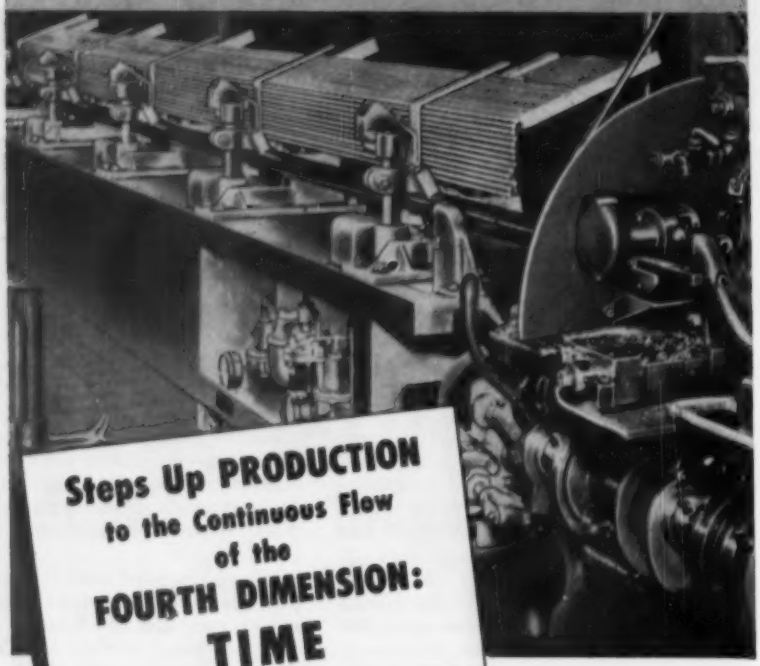
Now... A Screw-Machine-Feed that BREAKS THE TIME BARRIER!



Steps Up PRODUCTION to the Continuous Flow of the FOURTH DIMENSION: TIME

EVERY TIME a screw machine cuts air... every time feed fingers are adjusted or replaced... every time remnant removal forces a shut-down — *that's time lost forever, never again to be made up in the production quota!*

In the modern Lipe Automatic Magazine-Loading Bar Feed, we present a continuous-feed mechanism that utilizes *every minute* of the working day for production...and still more production.

There's *No* cutting air. *No* feed fingers. *No* remnant problem. *No* minimum or maximum run. *No* limit on length of feed. *No* selective stock length requirement.

There IS a definite increase in production — up to 100% on some installations — *at least* 30% on every one!

Send today for FREE BOOKLET giving full details on Lipe's AML Bar Feed — today's big advancement in screw machine stock feeding. We will also supply name of your nearest distributor.

Lipe-ROLLWAY CORPORATION
Manufacturers of Automotive Clutches and Machine Tools
Syracuse 1, N. Y.

Changeable bowl simplifies cleaning operation . . .

the use of heavy fuel, thus saving almost 50 pct of the distillate's cost. The required purifying equipment is soon repaid by savings that accrue from the use of heavy fuel, and diesel operating costs are greatly reduced.

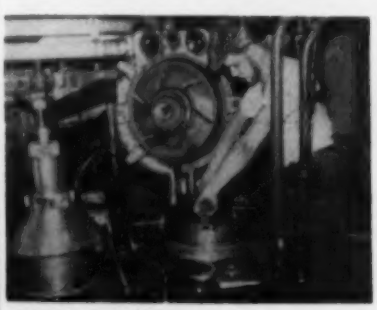
Bowl Catches Sludge

Heart of the new cleaning technique is an exchangeable bowl liner. Placed inside of the separator, this bowl catches sludge which has been separated from the heavy oil. By using two liners, each serving as a replacement for the other, cleaning down-time is cut to minutes.

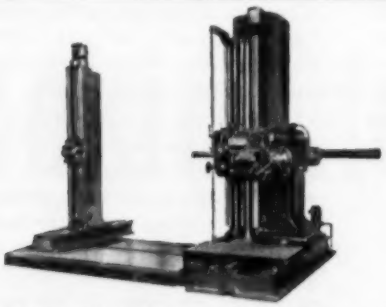
Since the new accessories make cleaning the centrifuges easier and faster, only one man is required to do the job. To start the cleaning operation, the centrifuge hood and bowl are opened, the hydraulic lifter swings over the centrifuge, picks up the upper bowl and complete disk set and swings them away.

Assembly Swings Into Place

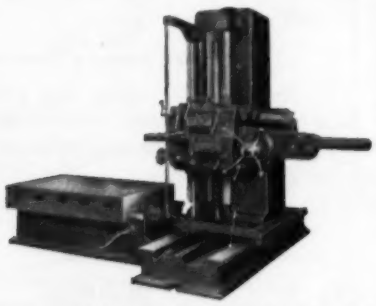
The operator simply removes the sludge-filled liner and replaces it with a clean one. The upper assembly then swings back into place, the centrifuge bowl and hood are closed, and the separator resumes operation. While liners are being changed, the disk set should be dipped into light diesel oil to loosen remaining sludge, which centrifuges out when operation resumes. During free time, the operator cleans the contaminated liner which is then held for re-use during the next cleaning period.



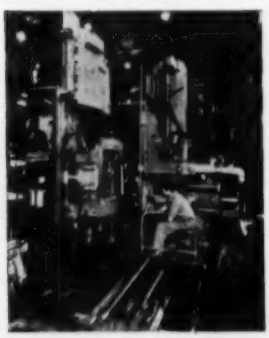
Sludge lifts out . . .



Floor type with bed plate and boring bar support. Used in shops where workpieces are large, weighing as much as 20 tons. Stationary or adjustable tables can be attached to the bed plate.



Floor type with large table, adjustable either by hand or power. The Gilbert machine can be rail mounted to increase operating range and flexibility.



Large Gilbert floor type horizontal boring mill equipped with a duplicating attachment for spindle. 3¼" spindle, 96" vertical travel of spindle head, 120" horizontal travel of column on runway.

Specification summary	floor type
Spindle diameter	*3½" or 3¾"*
Continuous feed to spindle	*30"*
Vertical travel of spindle head	*36"-96"*
Horizontal travel of column	*48"-"168"*
Drive motor, hp	*7½ or 10HP*

sell machine time for less per hour

You can sell your machine time for much less per hour if your machine is a Cincinnati Gilbert boring mill.

Take the floor type Gilbert, for example. Combine the basic machine with one of Gilbert's many workholding units, and you can do as many operations as you can do on equipment costing many times more. With the revolving-column Gilbert, you can even mill cavities with straight sides or reverse curves without resetting work. If you wish, the Gilbert mill can be adapted to workholding equipment or runways already in your shop.

Ask for a proposal; you'll see that it pays to replace with a Gilbert. New literature will be sent at your request.

Those who buy Gilbert buy Gilbert again

A 48" x 120" auxiliary table, with outboard supports, added to a Gilbert floor type machine equipped with an adjustable table. This combination reduces set-up time in operations on pieces of unusual size or shape.

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THE CINCINNATI GILBERT MACHINE TOOL CO., 3366 BEEKMAN ST. • CINCINNATI 23, OHIO

Brazing:

Simple technique used for brazing sintered parts.

By using sintered metal parts and joining them with low-temperature silver brazing alloys, a number of metal fabricators are realizing substantial savings in material and labor costs over their former method of machining these parts from solid metal.

However, because of its occasionally high porosity, sintered metal may be tricky to braze. When the sinters are made dense, they can be brazed normally. But when the parts are porous—typically in bearing applications—the porosity may interfere with the making of a good joint. Porous compacts tend to absorb the brazing alloy, much like a sponge soaks up water, leaving little or no alloy for the joint.

The technical laboratory of Handy & Harman, manufacturer of brazing alloys and fluxes, reports a convenient and practical solution for overcoming porosity problems when brazing sintered parts.

The method consists of filling the pores just below the surface of the metal with colloidal graphite. The graphite forms a non-wettable, non-absorbent coating which prevents the alloy from soaking into the interior of the piece. Graphite emulsions, in either oil or water base, are available commercially for this purpose. In some cases the oil-base may be preferred because it usually penetrates into the metal more readily.

How To Prepare Compacts

Here is the step-by-step procedure recommended by Handy & Harman for preparing porous compacts for brazing:

(1) Apply the colloidal graphite, by hand brush or dipping, to the surfaces to be brazed.

(2) Let the solvent evaporate. The water emulsion will usually dry satisfactorily in air; the oil emulsion may require a short drying period in an oven.

(3) After the piece is dry, remove the graphite coating from the *surface* of the metal using emery cloth or a brushing wheel with light contact pressure.

(4) Degrease with carbon tetrachloride or other solvent, taking care not to handle the joint surface or touch it with oily materials thereafter.

(5) When the piece is dry, flux and braze in the usual manner.

Coat faces first . . .

HERE'S A HEAD THAT TILTS
and Yours Will Nod, Too When You See What You Can Do With This One
POPE
SUPER PRECISION 1 HP,
3600 RPM MOTORIZED TOOL AND CUTTER GRINDER
CLEARANCE ANGLE SWIVELLING HEAD
With Angular Adjustment In A Vertical Plane
Give this versatile head the nod and save time and money these seven ways:
1. You can use cup wheels for practically all clearance angles and thus produce a cutting edge on tools that lasts longer because it is stronger.
2. You can keep the tooth rest on the center line of the cutter for practically all grinding on centers or in the work head.
3. You can grind most cutters and reamers all over with a single set-up using the swivelling table and Pope tilting head.
4. You can read all clearance angles directly in degrees from the scale provided on the head. No more mistakes.
5. You can get the right clearance angle on such tough grinding jobs as slab mills, taper reamers, angular cutters and form tools.
6. You have one safe speed — 3600 RPM — for all wheels generally used on cutter grinders. Heat checking of cutters is virtually eliminated.
7. You have a head that's so easy to adjust and use it saves you time and money every time you grind a tool.
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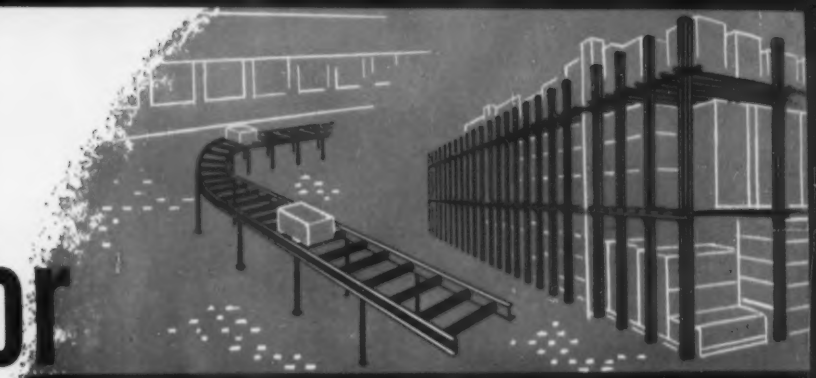

material handling equipment

ideas?

Could be you are overlooking a good bet if you aren't familiar with what Van Huffel can do in cold forming metal shapes and tubing.

To give you a better picture of how other manufacturers are cutting costs and improving their products, we have prepared a portfolio of ideas that should be in your file. It's yours free for the asking.

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Broaching:

Automatic loading speeds production of ring gears.

Adaptation of automatic techniques to a broaching operation is proving to be a natural in increasing the production of ring gears.

One of the latest examples is an automated development by the Colonial Broach Co., Detroit, that broaches the inside diameters of automobile differential ring gears at the rate of 300 per hour.

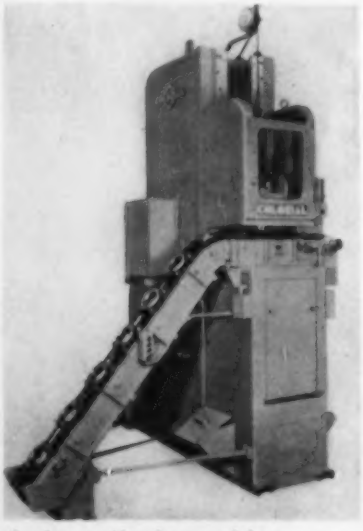
The machine used for this operation is an RU 15-48, a 15-ton pull-up machine with a 48-in. stroke. Automating this machine for its high output capacity entailed equipping it with an automatic, chain-type loading fixture that permits loading of gear blanks from floor level. Normally, broaching machines with this capacity must be operated from a platform, or set in a pit to allow floor level operation.

Provides Flexibility

Another advantage of this continuous method of loading is the freedom and flexibility it offers the operator in keeping the machine loaded with blanks. It is not necessary to stand next to the broaching station continuously to insure 100 pct cycling efficiency. The operator may load several blanks at one time, thereby breaking the loading routine, and freeing him for other duties.

Twenty-two identical locating fixtures and 22 broach return gaps are spaced alternately along the double chain loading conveyor. The conveyor is driven hydraulically and indexed every half machine cycle, once for the cutting stroke, and once for the broach return stroke. Broached blanks are gravity unloaded as the conveyor sweeps around the sprockets at the unloading station.

All hydraulic and electrical circuits are interlocked for both timing and safety. One such example is the safety precaution taken to insure that the broach puller properly engages the broach during each cycle.



Automatic broaching . . .

See it work!
Western Tool Show
and
Western Metal Show

color-glance

Brinell Hardness Tester

- Automatically signals relative hardness.
- Speeds up testing cycle with greater economy, yet assured accuracy.

3 colored lights *immediately* tell you:

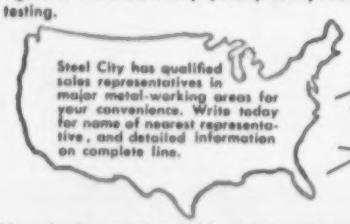
TOO HARD —— yellow
WITHIN RANGE — green
TOO SOFT —— red

The right color flashes automatically during each test

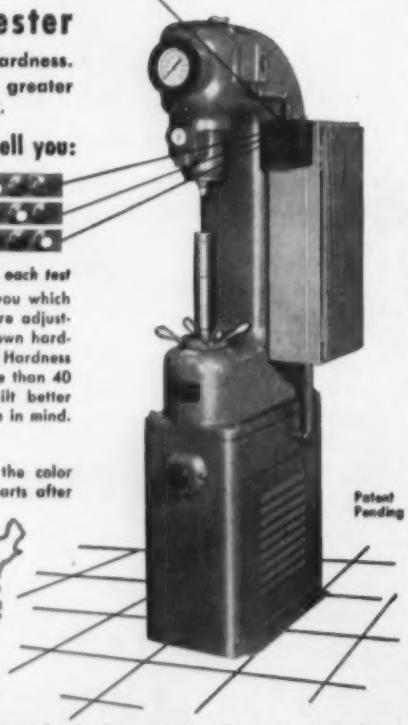
Here is the machine that decides for you which pieces are of proper hardness. Ranges are adjustable, easily set up by using pieces of known hardness or test bars. Color-Glance Brinell Hardness Tester is another Steel City *first*. For more than 40 years Steel City has designed and built better machines, with your particular application in mind.

Ideal for automation.

The electrical circuits which operate the color signals can be used to physically sort parts after testing.

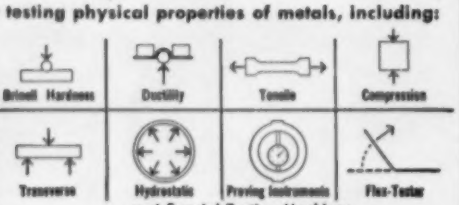


Steel City has qualified sales representatives in major metal-working areas for your convenience. Write today for name of nearest representative, and detailed information on complete line.



Patent Pending

Manufacturers of machines for testing physical properties of metals, including:



Steel City Testing Machines Inc.
8815 Lyndon Ave. Detroit 38, Mich.

. . . and Special Testing Machines.

Testing:

Special fixture provides accurate production testing.

By combining advantages of both special and standard equipment in a single highspeed device for testing a code plate plunger assembly. The Bard-Parker Co., Inc., Danbury, Conn., solved a testing problem in its plant.

Buzzer Signals Contact

A standard force indicator, made by the Hunter Spring Co., Lansdale, Pa., has been built into a special fixture equipped with a buzzer system and a vulcanized fiber block containing the mechanism being tested. The assembly is inserted into the block and the force indicator is moved forward by hand so that it meets and compresses the tip of the plunger.

Slides In Base Plate

A special test fitting is screwed on the end of the force indicator. The indicator's movement is guided as a metal bar secured to its underside slides in a grooved base plate. The plunger assembly is then always properly loaded parallel to the axis of the compression spring.

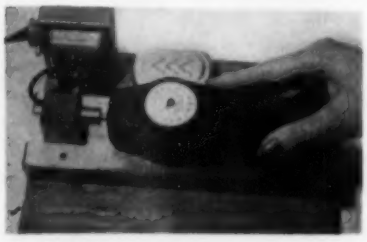
When the special test fitting meets the metal sleeve in the block, the test length specified by the user is met. A buzzer sounds as contact between the fitting and sleeve completes a circuit, the indicator is backed off until the buzzer stops, and the reading is taken at the breaking point.

The specified load at the test length is 0.203 lb ± 0.024 lb so that the dial pointer of the force indicator must read between 2.9 and 3.6 oz in order that an assembly be accepted.

Mark Dial Indicator

In actual practice for 100 pct testing, the crystal of the dial indicator is marked with a grease pencil at the allowable load limits. The accepted assemblies are divided into pairs according to load test for shipment.

The testing device permits very rapid inspection, since the operator can concentrate on the dial, while maintaining the high accuracy provided by the force indicator.



Indicates accuracy . . .

Better, More Economical . . . via DIFFERENTIAL

The yawning bucket drops a huge chunk of waste into this Differential Air Dump Car. Next time the "Sunday Punch" may be tons of reddish hot slag.

For day in, day out service under the rigors of steel mill loading practice, these Differentials perform to the point where steel mills are buying more and more every year.

Unusually rugged design and construction, plus heat resistant floors, when indicated, are part of the answer. Out at the dump it's a matter of seconds to unload completely anything that can be loaded — dumping to **either** side. It all adds up to better, more economical transportation **via Differential.**

Send for detailed specifications!

DIFFERENTIAL PRODUCTS INCLUDE: Air Dump Cars, Charging Box Cars, Ingot Mold Cars; Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems.

D
DIFFERENTIAL
STEEL CAR COMPANY
FINDLAY, OHIO

SINCE 1915—PIONEERS IN HAULAGE EQUIPMENT

free machining MAX-EL alloy steel worm finish machined after full heat treatment...

This double enveloping worm of Crucible MAX-EL® 3½ alloy steel, made by Cone Drive Gears, Division of Michigan Tool Company, was completely machined *after full heat treatment.*

As our customer writes: "This requires an extremely free-cutting material in order to secure desired accuracy, and we have used MAX-EL quite successfully, due to its free machinability in the heat-treated state (Rockwell C 35-38)."

But try MAX-EL for yourself. You'll find that its free machining qualities, freedom from distortion, deep hardening characteristics, and the longer tool life you will get from its use, will help your production line run smoother. For further information, and *fast* delivery of MAX-EL – *call Crucible.*

CRUCIBLE first name in special purpose steels

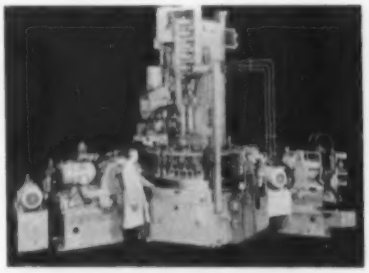
54 years of Fine steelmaking **ALLOY STEELS**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 113 or 114

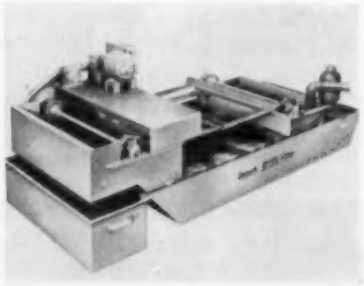
Automation machine features 96-in diam. index table



New 8-station machine tool is adapted to close tolerance boring, drilling, tapping, facing and line reaming operations on a wide variety of parts produced at high production rates. Size of fixture permits mounting two medium-sized production parts in each, and processing of two parts at one time at each station. The machine is adapted to carbide tooling applications on cast iron parts. The 14-ft high center column provides adequate vertical head travel for line reaming where tools are piloted in both bushing plate and fixture. *Snyder Tool & Engineering Co.*

For more data circle No. 33 on postcard, p. 113.

Delpark Up-Flo filter uses permanent filter media



New principle in automatic, self-cleaning industrial filtration filters fine and coarse particles from liquids through a permament filter medium. The Delpark Up-Flo filter utilizes gravity to remove the heavier solids before filtration of the liquid through a horizontal bar-type screen. Only fine particles held in suspension reach the screen. Chain driven flights operating on a time lapse sequence pass under the filter and remove deposits from the underside of the screen and the area beneath the screen. A device cleans particles from the flights. High filter efficiency is maintained on high capacity and full flow. *Industrial Filtration Co.*

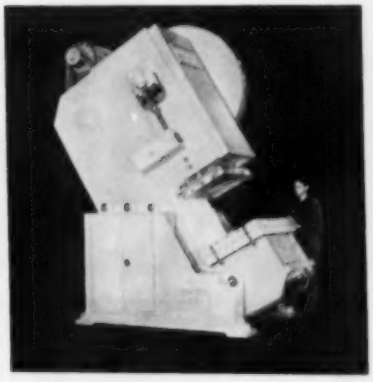
For more data circle No. 34 on postcard, p. 113.

Angle plates, height blocks simplify measuring jobs

New height blocks and angle plates with heat-treated, alloyed aluminum bodies and hardened steel tops and bottoms can be used singly or in combination to secure a wide range of heights for varied work requirements. Shot pins are provided on the height blocks for stacking. Aluminum bodies are used for lightness. Six sizes of angle plates are standard ranging in height from 24 to 72 in. Jog blocks inside angle plate are provided for slight movement. Height blocks are 5 to 20 in. high, in 5-in. increments. They are parallel to ±0.005 in. in 12 in. and heights are ±0.001 in. within size. *Machine Products Corp.*

For more data circle No. 35 on postcard, p. 113.

New 150-ton gap presses feature steel frames



A new approach in design has been taken to achieve minimum deflection in the new steel C frames of the Series Gl-150 gap presses. The single point press is built in either fixed base or inclinable type. Standard, centralized or cabinet leg controls are available. Heavy duty capacity is 150 tons. Standard stroke is 6 in.; standard speeds, 80 or 105 strokes per min for the flywheel presses and 30 strokes per min for geared presses. Bed area is 30x50 in. and slide area 24x34 in. The inclinable press illustrated has cabinet legs and electric motorized inclining mechanism. It can be inclined from vertical to 30° in 3 min. A fixed base single geared press uses clutch in gear arrangement with all gears totally enclosed running in oil. *Minster Machine Co.*

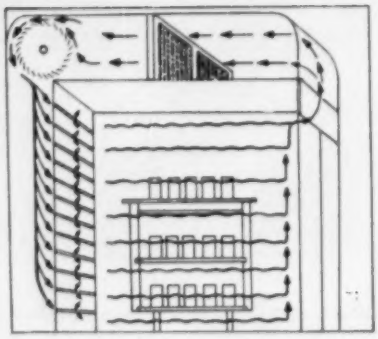
For more data circle No. 36 on postcard, p. 113.

Turn Page

Baking oven accommodates large and small units

An improved quality of finish has been obtained by a manufacturer of surgical instruments by installing electric duct heaters in a new baking oven which accommodates both large and small units. Other variable requirements are met by means of flexible heat controls: a thermostat with indicating dial, plus an upper-limit safety control. Two Chromalox electric air blast heaters, rated at 20 kw each, were selected for easy installation in the air duct of the plenum chamber. Uniform heat is supplied by a fan that circulates the air through the finned heaters and down into the lower heating chamber. Louvers on the side wall direct the hot air so that oven contents are heated evenly. *Edwin L. Wiegand Co.*

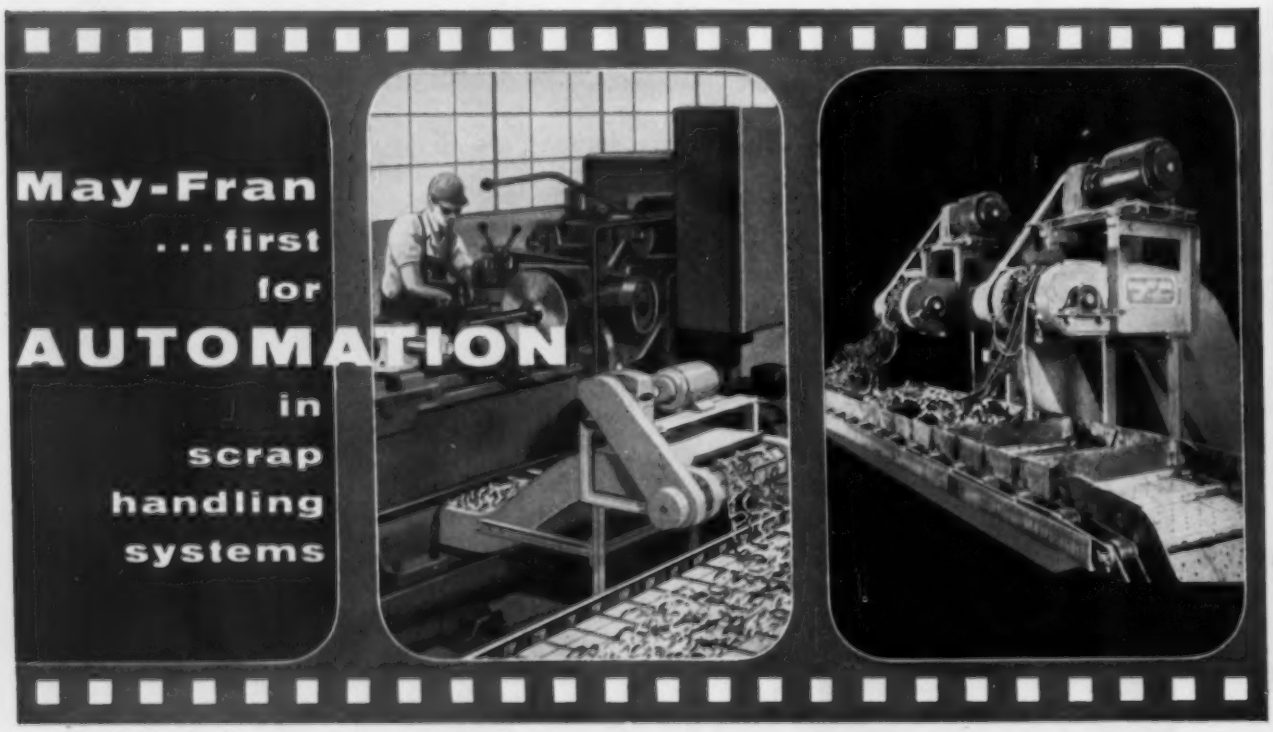
For more data circle No. 37 on postcard, p. 113.



Simultaneous gaging for a series of holes

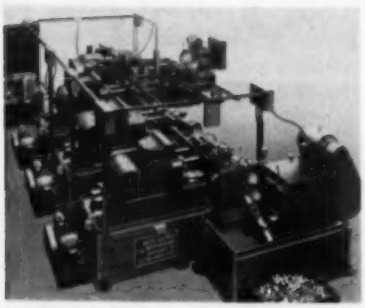
Four holes in a nozzle plate are inspected simultaneously on this new Multi-Dimensionair air gage. The inspection consists of measuring the diameter of each hole and checking them for roundness. The piece is placed on the platen so that an air plug fits into each hole. First Dimensionair dials are read to determine the hole diameters. If they are okay a push rod connected to the plugs with gear train to rotate them, is pushed in and out to make the roundness check. Dials are read from left to right as each hole is checked. Push rod is only moved in one direction to turn the plugs 180°; that is, it is pulled out to do the roundness check for one hole and pushed in for the next. Any similar piece can be checked. *Federal Products Corp.*

For more data circle No. 38 on postcard, p. 113.



The CHIP-TOTE conveyor permits complete utilization of machine tools by eliminating shut-down for manual scrap removal.

It handles a continuous flow of hot, wet or dry chips, turnings and borings from any multiple spindle automatic machine.



Multiple station machine uses standard units

Refrigerator cylinder brackets are processed on a 15-station in-line type transfer machine at the rate of 380 pieces per hr at 100 pct efficiency. The part is produced from standard 3x2½x½ in. hot rolled angle iron. The first station saws the angle iron to accurate lengths so that three equal length pieces can be discharged at the final station. Milling, reaming and drilling operations are performed on the various intermediate stations which are equipped with 15 hp way-type power units, with multiple-spindle heads. The standard machine units used are hydraulically actuated and electrically controlled. *Motch & Merryweather Machinery Co.*

For more data circle No. 39 on postcard, p. 113.

New 15-ton punch press built to quality standards

Fast, precision stamping, minimum downtime, and long service life are claimed for a new 15-ton punch press. Construction features include solid one-piece, alloy-steel crankshaft, heat treated and precision ground. Pin diameter is 2⅜ in. Flywheel, carried on two roller bearings, is 20 in. diam and weighs 200 lb—sufficient weight for full capacity punching at both high and low speeds. Extra-long, V-type ramways give precision guidance throughout most of the ram travel distance. Ram hole is 1 9/16 in. accommodating standard die sets. Ram area, f to b and r to l is 4x5 in. Bolster plate area is 11x14 in. Driving mechanism is contained in the clutch collar. Flywheel is fitted with a companion drive. *Kenco Mfg. Co.*

For more data circle No. 40 on postcard, p. 113.

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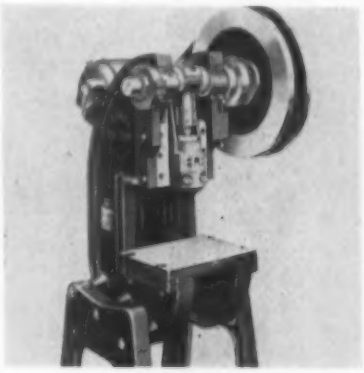
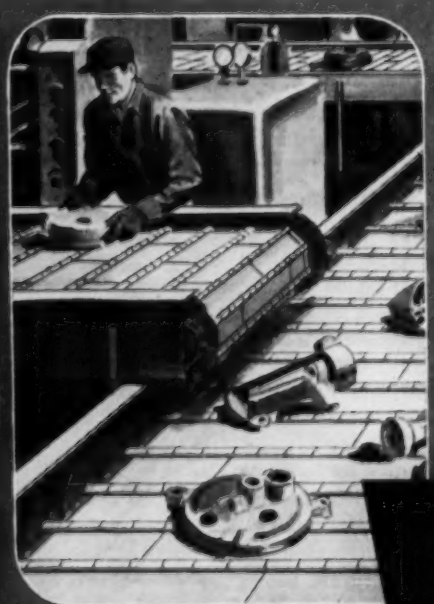




Now is the time to put AUTOMATION to work . . . Now is the time to cut production costs . . . May-Fran engineers design and build complete scrap handling systems for the automatic removal of machine turnings or chips. May-Fran conveyors will transmit scrap to ultimate point of disposal.

Press Scrap systems can be made completely automatic. Hinged-steel belt will take scrap from presses, handle it through blanking, shearing, forming and baling processes, and deliver it to rail cars.

May-Fran is prepared to engineer, fabricate and install complete conveyor systems to your specifications.

Write today for complete information on how an automatic scrap removal system will cut your production costs.

Bulletin MF-530 describes the new Hinged-Steel conveyor belt.

Bulletin MF-640 describes the Chip-Tote conveyor which removes scrap from operating machines.

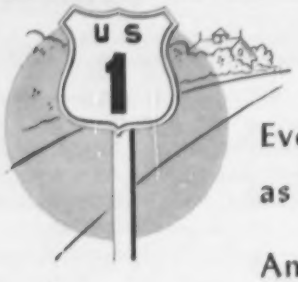
DESIGNERS AND ENGINEERS OF COMPLETE SCRAP HANDLING SYSTEMS

MAY-FRAN ENGINEERING, INC.

Hinged-steel belting handles scrap as well as hot heavy and abrasive castings. Belt is economical . . . maintenance-free.

SHEJ-MF

1698 CLARKSTONE ROAD
CLEVELAND 12, OHIO



Everyone recognizes this as a sign of going places . . .

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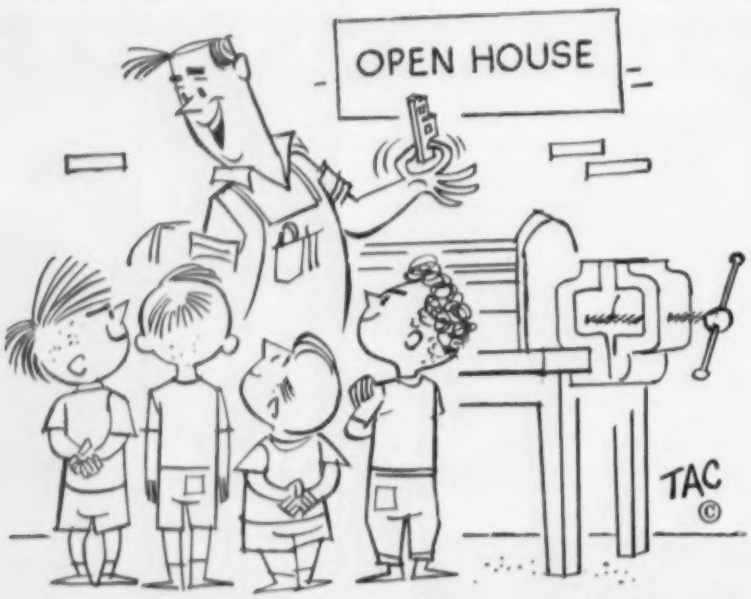

"...these dies are so tough even you kids can't destroy them. They're made of ATMODIE® air hardening die steel."

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.

Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.

TOOL COLUMBIA STEELS

Magnetizing jig

Faster inspection of small parts is possible with the new X-1584 vertical contact adapter. No time is lost holding the part, and the second hand is left free. The X-1584 is really a special jig that fits any standard horizontal Magnaflux unit. Almost no installation is required,

and once installed it can be connected or disconnected in 2 to 5 min. It substantially reduces inspection man-hours and costs on the smaller parts without limiting in any way the versatility of the basic Magnaflux unit. The adapter comes with quick-disconnect air hoses for the necessary pneumatic connections. Cables and attachments for magnetizing current are provided. Adjustable contact heads handle parts 12 in. long x 10 in. diam. *Magnaflux Corp.*

For more data circle No. 41 on postcard, p. 113.

Protective coating

New vinyl mastic protective coating needs only one-coat application to provide effective corrosion control. It also reduces possibility of edge corrosion because its heavy, impervious film provides a tough, corrosion resistant barrier around edges and sharp objects. Amercoat No. 87 can be applied at a thickness of 10 mils in one double-pass spray coat. Despite its high solids content, the coating is applied with conventional industrial spray equipment. New properties of No. 87 are the result of an increased vinyl resin content which was made possible by new combinations of solvents. Non-volatile content is in excess of 55 pct. *Amercoat Corp.*

For more data circle No. 42 on postcard, p. 113.

Turn Page

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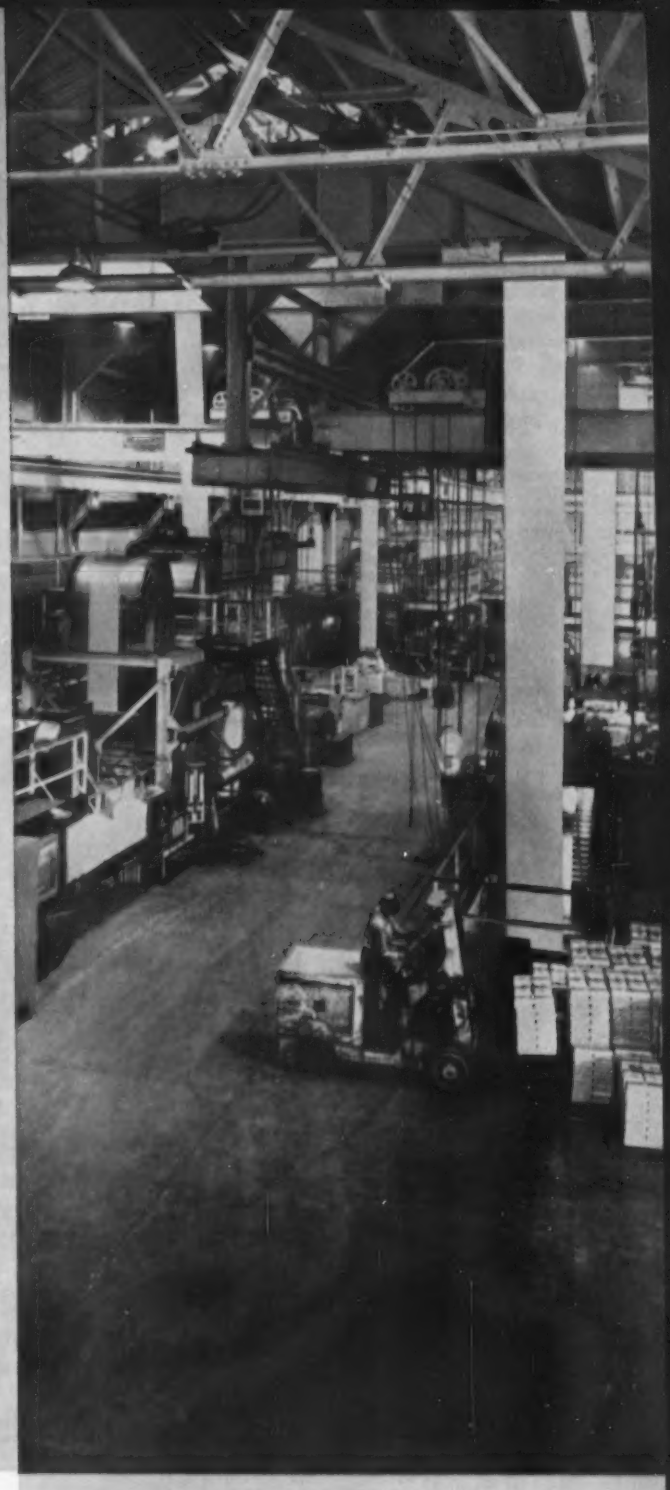
CONTINUOUS GALVANIZING LINES BUILT BY AETNA



● **The 25th Aetna-built Continuous Galvanizing Line** could be yours. If you are considering a Continuous Galvanizing Line, you probably have ideas about the most practical process for your production. The lines offered by Aetna-Standard include all of the different processes and types in use today. This ability to combine specialized knowledge of Continuous Galvanizing with your own specific ideas is a principal reason for Aetna's building more lines than all other manufacturers. Add the most important requirement of all—performance of the equipment, plus integrity and ability to work with people, and you have some of the reasons why more companies select Aetna-Standard than any other manufacturer to build their Continuous Galvanizing Lines.

Will the 25th be yours?

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Aetna-Standard

PLANTS IN WARREN, OHIO • ELLWOOD CITY, PENNSYLVANIA

GOOD EQUIPMENT BRINGS DOWN PRODUCTION COSTS

SUBSIDIARY and ASSOCIATED COMPANIES

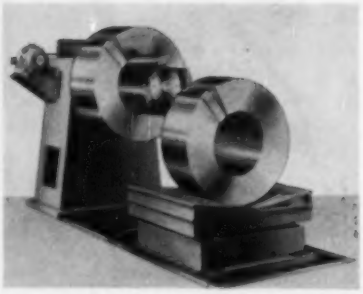
Head Wrightson Machine Company, Ltd., Middlesbrough, England — Great Britain, Finland, Sweden, Norway, Denmark, Union of South Africa, Northern and Southern Rhodesia.
Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Canada.
M. Castellvi, Inc., New York, N. Y. — Mexico, Central and South America.
Societe de Constructions de Monthard, Paris, France — France, Belgium, Holland, Luxembourg, Switzerland.
Demag Aktiengesellschaft, Duisburg, Germany — Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.
Compagnia Italiana Forme Acciaio, Milano, Italy — Italy.
Aetna-Japan Company, Ltd., Tokyo, Japan — Japan.
Hale & Kellgren, Inc., Akron, Ohio — Representative for the Rubber Industry.

Designers and Builders to the Ferrous, Non-Ferrous, Leather, Rubber, and Plastic Industries

New unit lifts, travels and decoils

Combination coil lift and decoiling reel with mechanical or hydraulic elevation handles coils up to 40,000 lb. Traverse action is by electric or hydraulic drive. The unit can be pit or floor mounted, for in-line or right angle travel with coil reserve saddle mounted or as illustrated. The decoiling reel is furnished free-running or motorized for constant drive or for threading only. It is equipped with drag type brake to introduce tension to prevent overrunning. Also available in double cone-type reel. The hydraulically expandable mandrel is mounted on Timken tapered antifriction bearings. *Dahlstrom Machine Works, Inc.*

For more data circle No. 43 on postcard, p. 113.



Electronic supervisor

Most advanced application of a new electronic supervisor will be to start and stop production line machinery in automated plants. The system follows preset programs and automatically switches on or off up to 40 groups of remote operations, each on its own schedule. The central control system uses carrier current signals and operates over existing electrical circuits. It does not require installation of a single transmission wire. Check on the remote electrically controlled services is made by glancing at the indicator lights on the panel. *International Business Machines Corp.*

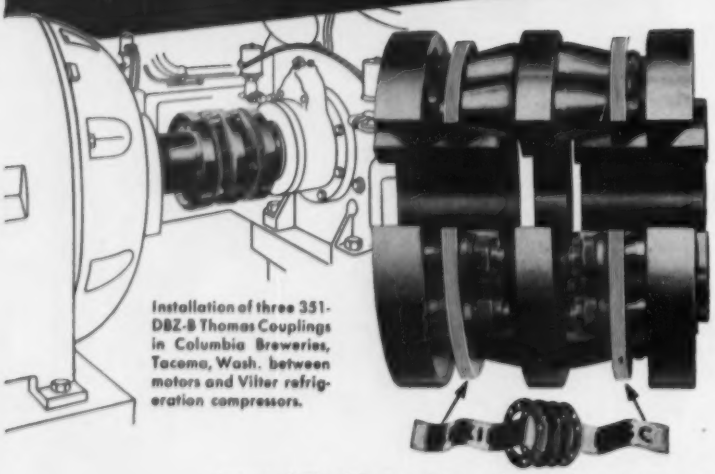
For more data circle No. 44 on postcard, p. 113.

Power saw

Rapid cut-off operations are possible on a new automatic power saw, designed to use the Demon high-speed steel saw band. Phenomenal cutting rates on the toughest materials are claimed for the saws. Features include unique hydraulic controls for maintaining feed pressure, adjusting blade speed and maintaining correct blade tension. Rapid, accurate, full automatic stock indexing is another feature. *DoAll Co.*

For more data circle No. 45 on postcard, p. 113.

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!



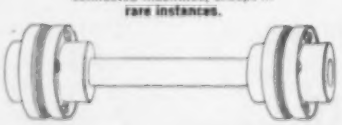
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



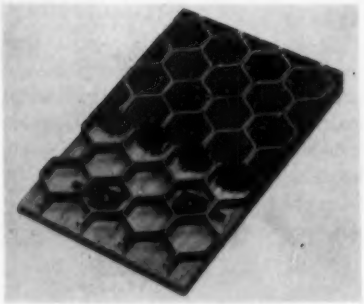
THOMAS

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY

Largest Exclusive Coupling Manufacturer in the World

WARREN, PENNSYLVANIA, U.S.A.



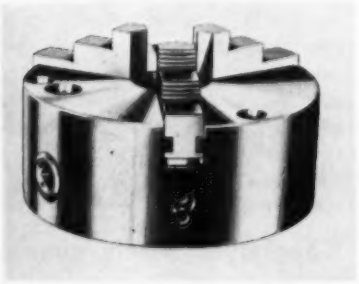
Steel floor armor has safety, economy factors

New Hexteel safety floor armor with less weight per square foot and greater exposed steel surface is most durable for abnormal wear and rough usage, although it is extremely economical to install. The exposed steel surface armor is 18.15 sq in. per sq ft, and weight of the new Hexsteel is 1.7 psi. Hexsteel can be used as a steel armor in new concrete floor installation, or in conjunction with a mastic fill on existing concrete or on old or new wood floors. Installation is simple; sides and ends of the Hexteel panels are easily locked together on the job site to form a continuous steel armored floor. *Klemp Metal Grating Corp.*

For more data circle No. 46 on postcard, p. 113.

Permits precise centering

New 3-jaw universal scroll chuck permits precise centering of the workpiece to less than 0.0005 total indicator reading. Cent-R-Quik incorporates a single-point fast-adjustment feature that will not shift even under heaviest cuts. Any



number of duplicate parts can be chucked accurately without making re-adjustments. All adjusting is done internally; there is no movement of the chuck body in relation to the machine spindle. Precision jaw-adjusting feature and side work-holding range of the chuck jaws eliminate need for collets. *Skinner Chuck Co.*

For more data circle No. 47 on postcard, p. 113.

Sound protectors

A device for protecting workers from harmful effects of loud noise encountered in many occupations is the new Straightaway Sound Protectors. Soft vinyl foam pads that fit snugly and conform to ear contours are held on externally by helmet and headband models. They muffle the ears and the adjacent bony structure, screening out loud, high-frequency noises, but voices are audible to the wearer. *American Optical Co.*

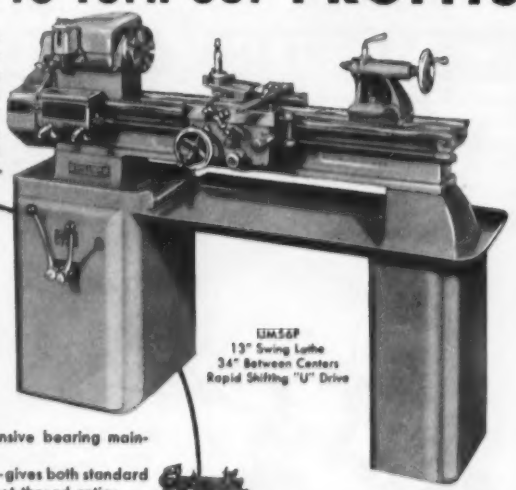
For more data circle No. 48 on postcard, p. 113.

Turn Page

SHELDON
CHICAGO U. S. A.

BUILT
• • • to Turn out PROFITS

Sheldon Lathes are designed and built to do accurate lathe work rapidly and profitably. Moderate in price they have the collet, swing and power capacity to do most toolroom work.



LUM-56P
13" Swing Lathe
34" Between Centers
Rapid Shifting "U" Drive

Design Features:
- Large and wide "Zero Precision" Tapered Roller Spindle Bearings—permit operation at all speeds, retain accuracy, and expensive bearing maintenance costs.
- 54-pitch Gear Box—gives both standard and many hard to get thread ratios.
- Large Micrometer Dials—Make accurate operation easier.
- Extra Collet Capacity—1⅜" hole through spindles available on 10", 11" and 13" swing lathes.
- More Power to Spindle—Efficient drives with bigger motors and double neoprene cog V-belts to spindle.

OPTIONAL FEATURES AT EXTRA COST
include: Hardened ways, Long Tapered Key Drive Spindles, 4" D1 Camlock Spindles bed turrets, collet attachments, and other production and toolroom accessories. Lathes available with a choice of "Bench," "Cabinet" or "Pedestal" mountings.

Write for New Catalog G-55

SHELDON MACHINE CO., Inc.
4224 N. Knox Ave. • Chicago 41, Illinois
See our display at the Western Metal Show, Booth 614

cut down shutdowns..

NON-SHRINK
EMBECO
PRE-MIXED
GROUT

Used in the steel and metal-working industry to produce *non-shrink* grouts for rolling mills, hydraulic presses, planers, lathes, shapers, and other equipment. Also for grouting building columns, anchor bolts, etc.

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Many advantages over plain cement-sand grouts—

- *Non-Shrink* with full bedplate contact... maintains alignment.
- *High Compressive and Impact-Resistant Strength*... takes vibration, pounding action.
- *Oil and Water Resistant.*
- *Flowable—Easily Placed* yet does not shrink upon hardening.

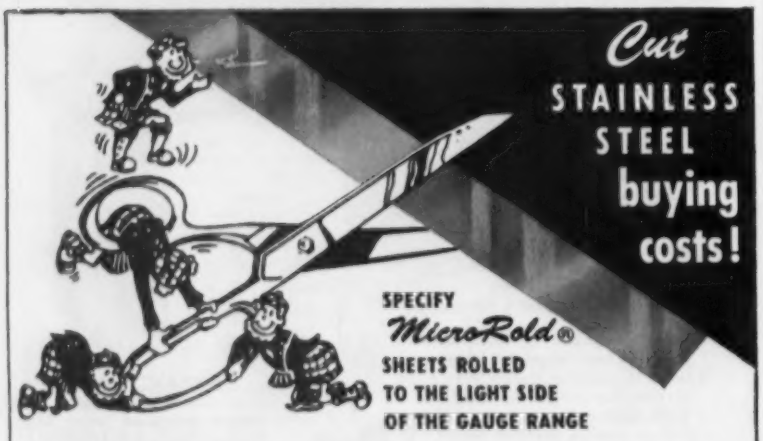
Recommended by leading equipment manufacturers.

EMBECO PRE-MIXED GROUT IS READY TO USE—you add only water. Write for 8 page illustrated booklet.

Creators and Manufacturers of Products to Improve Concrete and Mortar

THE MASTER BUILDERS CO.

CLEVELAND 3, OHIO — Subsidiary of American Marietta Company — TORONTO 15, ONTARIO



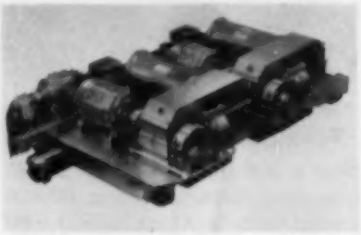
Washington Steel's production methods provide new economies in the purchase of stainless sheet. The controlled accuracy of gauge in the rolling process gives you more area per ton or the equivalent area with lesser weight. This close adherence to specified gauge also results in longer die life.

Washington Steel
CORPORATION
WASHINGTON, PENNSYLVANIA

Your steel warehouse distributor will gladly tell you the Micro-Rold Story.

Crane trolley

This heavy-duty, mill type crane trolley handles long, heavy materials that require two hooks. Hoists may be operated simultaneously or independently to suit the particular handling operation. The unit is furnished with a heavy, one-piece

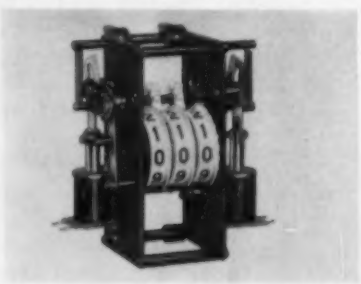


welded steel frame supporting the load and the machinery. The trolley features oil tight construction of the hoist gear cases which enclose all of the operating mechanism. The trolley is furnished with mill type motors, heavy duty electric brakes and Youngstown limit switches. Operation of motors is through full magnetic control located on the crane bridge. *Northern Engineering Works.*

For more data circle No. 49 on postcard, p. 113.

Counter subtracts, counts

New counter will count or subtract at a rate of 400 counts per min, up or down, in any sequence, one count per impulse, maximum 999. It can be set at a predetermined figure to automatically shut off at zero. Electrical coils are intermittent



duty—6 to 110 v ac. The counter is useful for many operations including those that require the maintaining of a set capacity, such as controlling flow of materials to machinery or conveyors, production and inventory, and control of physical capacity in areas. *Spencer Mfg. Co.*

For more data circle No. 50 on postcard, p. 113.

Turn Page

SITUATION UNDER CONTROL **BY KEOKUK**

KEOKUK
CHIEF KEOKUK:
"Little Chief say old way get smoke signals crossed He cut letters in blankets!"
PRINCESS WENATCHEE:
"As usual he has the situation well under control!"
dickstone

KEOKUK ELECTRO-METALS COMPANY
KEOKUK, IOWA
WENATCHEE DIVISION, WENATCHEE, WASHINGTON

Keokuk Silvery . . . the superior form of silicon introduction for steel plants and foundries . . . available in 60 and 30 lb. pigs and 12½ lb. piglets . . . in regular or alloy analysis. Keokuk also manufactures high silicon metal.

Smoke out high costs and control quality with Keokuk Silvery Pig Iron! Keokuk assures less waste and exact control of the melt through uniform silicon distribution. Car for car, pig for pig, its uniformity *never* varies. Charge Keokuk by magnet or count.

SALES AGENT: MILLER AND COMPANY

332 S. Michigan Ave., Chicago 4, Illinois
3504 Carew Tower, Cincinnati 2, Ohio
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Hyde Park
RED CIRCLE Rolls ALLOY-CHILLED

Rolling Mill Equipment

For more than 50 years Hyde Park Steel Mill equipment has been helping American industry lead the world—equipment such as—

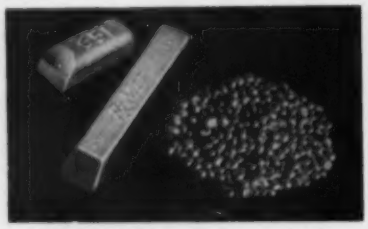
Bar Mills
Merchant Mills
Sheet and Strip Mills
Pinion Stands
Roller Tables
Reduction Drives
Stretcher Levellers
Guillotine Shears
Sheet Mill Shears
Roll Lathes
Special Machinery
Machine Work

For finer finish, long life and greater tonnage, specify Red Circle Rolls.

Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland Co., Pa.
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

Universal stainless steels

New U steels are based upon new techniques of closer metallurgical control, so that one analysis now meets all of the various specifications. Stainless steel Master Alloys are refined, pre-alloyed



metals specifically designed for remelting to produce precision castings. They are furnished in three convenient shapes — slugs, ingots and shot. Their use means simplified stock and production records. Inventories can be reduced without loss of ability to service customers. *Waimet Engineering Co.*

For more data circle No. 51 on postcard, p. 113.

Indicator depth gage

Selection of completely standard indicator depth gages to conform to varying part conditions is made possible by availability of interchangeable gage components. These components, which are carried in stock, may be selected to make up 15 basic models. Each model has sufficient adjustability so that no

alterations are required to set the gage to a gaging dimension, and simplicity of design assures accurate readings under production gaging conditions. Versatile design of each gage component allows adjustment to compensate for engineering changes. *A. G. Davis Gage & Engineering Co.*

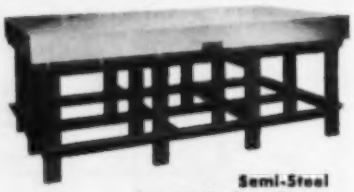
For more data circle No. 52 on postcard, p. 113.

NOW TWO TYPES OF CHALLENGE SURFACE PLATES

NEW! CLOVIS BLACK GRANITE
Rated Class A. Surface accuracy guaranteed.

FINE GRAIN SPECIAL ANALYSIS SEMI-STEEL
Precision ground or hand-scraped

STILL ONE STANDARD OF CHALLENGE QUALITY!



Semi-Steel Layout Surface Plates
High compressive strength . . . Low coefficient of expansion. 16 standard sizes, 6" thick — other sizes to order. Also available for sectional assembly into unlimited sizes.

Cast-Iron Top Work Benches
Four sizes, three styles. For individual use or on a continuous line. With self-contained storage facilities.

Other Challenge Precision Products:
Clamp Edge Layout Plates • Reading Tables • Lapping Plates • Welding Tables • Surface Plates • Bench Plates • Surface Plate Equipment.

See the full line of Challenge Clovis Black Granite and Semi-Steel Surface Plates in the new Challenge Catalog. Send for your free copy today!

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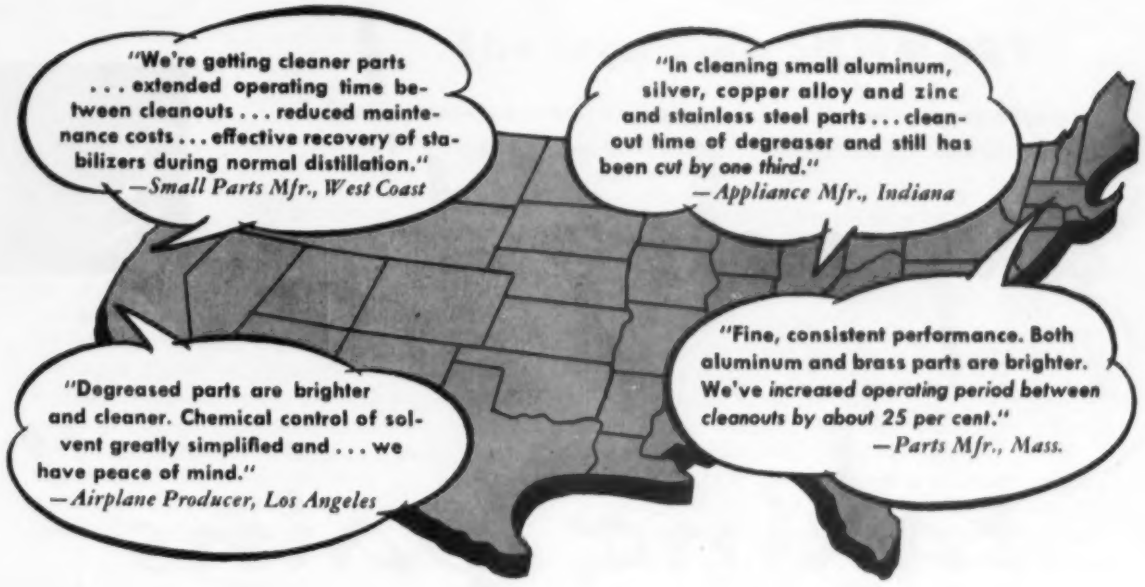
Challenge®
THE CHALLENGE MACHINERY CO.
Office, Factories and Show Room
GRAND HAVEN, MICH.

Here's what they're saying about
ALL-PURPOSE TRICLENE® D
(Trichlorethylene)


"We're getting cleaner parts . . . extended operating time between cleanouts . . . reduced maintenance costs . . . effective recovery of stabilizers during normal distillation."
—Small Parts Mfr., West Coast
"In cleaning small aluminum, silver, copper alloy and zinc and stainless steel parts . . . clean-out time of degreaser and still has been cut by one third."
—Appliance Mfr., Indiana
"Degreased parts are brighter and cleaner. Chemical control of solvent greatly simplified and . . . we have peace of mind."
—Airplane Producer, Los Angeles
"Fine, consistent performance. Both aluminum and brass parts are brighter. We've increased operating period between cleanouts by about 25 per cent."
—Parts Mfr., Mass.

Du Pont's vapor degreasing solvent gives you brighter, better cleaning of all metals

Check these extras

EXTRA DURABILITY. *New* "Triclene" D has unsurpassed resistance to *all* major causes of solvent breakdown—heat, light, air, light metal chlorides, and acidic materials. It retains its original ruggedness even after repeated use and distillation.

EXTRA OPERATING ECONOMY. You get safe, thorough cleaning with *new* "Triclene" D. Rejects are not a problem . . . cleanouts are quicker and easier.

EXTRA CONVENIENCE. *New* "Triclene" D is truly ALL-PURPOSE—built to give you dependable performance in *any* degreasing job. Just *one* brand of solvent to buy for any type degreaser . . . for any class work.

All these extras add up to the finest solvent ever produced for vapor degreasing—new, all-purpose "Triclene" D. Let us tell you more about it. Just fill out and mail coupon below.

New All-Purpose

"TRICLENE" D

Trichlorethylene

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

SEND FOR THIS NEW DESCRIPTIVE FOLDER

E. I. du Pont de Nemours & Co. (Inc.) IA-3
Electrochemicals Department, Wilmington 98, Del.

☐ Please send me your descriptive folder on new, all-purpose "TRICLENE" D.

☐ Please have your representative call with the details.

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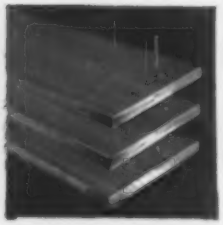
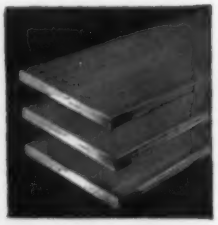
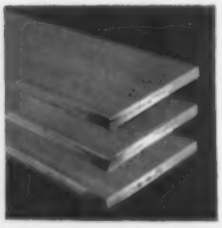


"an infinite capacity for taking pains"





That's a well known definition of "genius." We at Claymont don't claim to be geniuses. But we are proud of the fact that "taking pains" is an essential part of our working policy in the making of carbon and alloy steel plates.

Because of our close-knit organization, every order for plates—large or small—receives careful, personalized supervision . . . painstaking attention to every detail.

Claymont salesmen, engineers, metallurgists, laboratory analysts and skilled workmen form a coordinated group, teamed up to turn out plates that are exactly suited to your individual fabricating needs.

To order, contact our nearest sales office or write direct to Claymont Steel Products, Wickwire Spencer Steel Division of CF&I, 813 West Street, Wilmington 99, Delaware.

Claymont Steel Products

CF&I

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Large Diameter Welded Steel Pipe • Flame Cut Steel Plate Shapes

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The Iron Age SUMMARY. . .

Steel producers are worried about scrap . . . Runaway market has mills fighting hard for control. . . March output may set record.

Worry On Scrap . . . Steel producers are worried about scrap. The mills are fighting hard to ease the pressure on supply and price. It's shaping up as a tough battle. Top-level meetings in Washington last week and this are the tip-off on the hassle over scrap exports.

There's plenty of reason for concern. Steel demand is mounting on a broad front. March production is likely to establish an all-time record for the industry; at least on a weekly basis, and probably for the month. Mills this week will operate at 92.5 pct of capacity, up one point from last week's revised rate.

Upturn Strong . . . The upturn is not just a flash in the pan. It's good for first six months and probably third quarter and beyond. Behind it is the basic recovery of the economy, seasonal influences on the market, and attempts at inventory-building by consumers.

Scrap is a red-flag subject for the mills just now. Prices have been rising despite efforts to halt the trend with more hot metal from blast furnaces. The problem has been aggravated by mounting export demand from Europe and Japan. THE IRON AGE Scrap Composite advanced 83¢ to $37.58 this week.

The potentially-explosive scrap market is responsible for proposals to limit export of prime grades and increase export of secondary material. Commerce Dept. issued new regulations covering scrap exports.

Government has a stake in the battle, too. Any move to restrict exports to our allies is bound to come under close scrutiny of the State Department and Defense Dept. which will have a lot to say about what is eventually done.

Meanwhile, steel demand is pushing toward a peak that may not arrive until next month. Influx of new business during the last two weeks ranges from 5 to 25 pct more than actual operating capacity at some mills.

Backlogs Up . . . This means that mill backlogs are increasing rapidly since all production equipment is not being brought into play immediately. Deliveries are becoming more extended. Products that two weeks ago were running 10 days or less ahead of deliveries are now extended to 60 days or more at some mills.

Smaller steel producers are increasing their share of the general prosperity. Their ingot production rates are rising toward a level with the national rate. Some larger mills are at near-capacity or beyond.

Steel Output, Operating Rates

Production	This Week†	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,240	2,218	2,095	1,652
Ingot Index				
(1947—49=100)	139.2	138.1	130.4	102.8
Operating Rates				
Chicago	95.5	93.5	90.0	78.0
Pittsburgh	92.0	91.0*	85.0	81.0
Philadelphia	84.0	84.0	84.0	67.0
Valley	91.0	90.0*	87.0	60.0
West	92.0	94.0*	87.0	72.5
Detroit	90.0	89.0	88.0	74.0
Buffalo	100.0	100.0	100.0	63.5
Cleveland	97.0	96.0*	82.0	60.5
Birmingham	86.5	86.5	79.0	78.5
S. Ohio River	77.0	72.0*	78.5	73.0
Wheeling	95.0	100.0*	97.0	86.0
St. Louis	96.0	96.0	86.5	43.5
Northeast	84.0	87.0	97.0	40.0
Aggregate	92.5	91.5*	87.0	69.0

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.797	4.797	4.797	4.634
Pig Iron (Gross ton)	$56.59	$56.59	$56.59	$56.59
Scrap, No. 1 hvy (gross ton)	$37.58	$36.75	$35.83	$23.50
Nonferrous				
Aluminum, ingot	23.20	23.20	23.20	21.50
Copper, electrolytic	33.00	33.00	33.00	29.875
Lead, St. Louis	14.80	14.80	14.80	12.55
Magnesium, ingot	27.75	27.75	27.75	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	90.625	91.125	91.25	90.00
Zinc, E. St. Louis	11.50	11.50	11.50	9.25

Market Buildup Broadening

Wider base has users jockeying for mill schedule position . . . Delivery battle on for cold-rolled, enameling sheets . . . Growing demand for structurals.

◆ BROADENING base of the steel market is aggravating consumer competition for position on mill schedules. Tight first-half demand for some products has consumers thinking in terms of third quarter.

The market buildup probably will continue all along the line as seasonal factors begin to bear down. Full impact of construction, farm, and linepipe is yet to be felt.

Steel customers have been fighting the battle of deliveries for weeks for such products as cold-rolled sheets, galvanized, enameling sheets. And more recently the going has been toughening for hot-rolled sheets, strip, electrical sheets, and bars.

Now they're confronted with growing demand for structurals, wire products, reinforcing bars, plates (electricweld linepipe), seamless linepipe, and oil country goods.

Meanwhile, tin mill product base prices for the six-month period beginning April 1 will be unchanged. U. S. Steel Corp. announced that prices for electrolytic and hot-dipped tin plate, black plate, and terne plate will be continued as is. Other producers are expected to follow suit.

U. S. Steel Export Co. announced it has increased price of galvanized sheets from $5.67 to $5.82 per 100 lb.

Strong plate market prompted Central Iron & Steel Corp. to boost carbon plate price $5 per ton to the $4.225 level of other producers.

SHEETS AND STRIP . . . Cold-rolled sheets solid in **East** through June; one producer accepting "inquiry only" on orders beyond that; hot-rolled extended to mid-May. In **Cleveland**, consumers would make cold-rolled commitments for August-September if mills would accept; hot-rolled just about as tight. In **Pittsburgh** it's a struggle to maintain delivery schedules. **Chicago** reports one mill has discontinued issuing rolling schedules mainly because of flat-rolled load on rolling mills; hot-rolled sheet slightly easier than cold-rolled but not enough to be comforting to consumers.

STAINLESS . . . Strip and sheet demand continues to mount. Some mills are booking flat-rolled orders for third quarter delivery.

ELECTRICAL SHEETS . . . Crucible Steel Co. and Allis-Chalmers Manufacturing Co. have teamed up to produce grain-oriented silicon in a new plant at **Midland, Pa.** Production expected to begin in April. (See page 59).

TIN PLATE . . . Mills rolling at capacity to keep pace with demand. Market is solid through first half. Tin mill base prices will remain unchanged for six-month period beginning April 1.

BARS . . . Demand for carbon and alloy continues to mount. Chief factors are automotive and, more recently, warehouses. Cold-finished bars improving but still lagging behind hot-rolled. Re-bar demand picking up seasonally. Jones & Laughlin Steel Corp. is producing lead-treated bars at Aliquippa plant under a licensing agreement.

PLATES . . . Backlog is growing. Consumers are strengthening inventories. Rolling mills busier as electricweld linepipe producers build stocks in preparation for heavier volume of linepipe demand. Some sources estimate that 350,000 tons gas transmission pipe business hanging fire pending go-ahead of Federal Power Commission.

STRUCTURALS . . . Heavy structurals are joining wide flange beams and light structurals in a seasonal pickup. Wide flange mills are operating at capacity. Light structural capacity at 90 pct in some centers. Standards gaining strength. Construction and highway projects are behind the uptrend.

WIRE PRODUCTS . . . The farmer is coming in strong, even better than expected. This is adding more strength to the booming wire market. Farm demand for merchant wire complements a strong manufacturers wire market. Construction wire is strong seasonally. **A Pittsburgh** district wire mill will operate at capacity this month for the first time in the last two years.

WAREHOUSE . . . Still no wild enthusiasm among warehouse people despite increasing evidence of better business and even better prospects. Distributors in some areas claim they have to fight for every order. But there's no question that the picture is brighter. Evidently most houses are trying to work off the balance of once-heavy inventories. Some smaller distributors, though, are hot after sheets and a few are laying in enlarged stocks of bars, especially cold-finished. March looks like a good month.

Warehouse prices on cold-finished bars were dropped 25¢ per 100 lb at big warehousing points. Prices were reduced on c-f carbon bars, hot-rolled strip, hot-rolled sheets, cold-rolled sheets, carbon steel plates, floor plates and standard structurals. Reductions range as high as $1 per 100 lb.

GENERAL . . . Calstrip Steel Corp., **Los Angeles**, is installing a new Sendzimir cold reduction mill to roll strip in widths up to 13 in. Mill will handle low carbon, spring steel, stainless, aluminum and nickel. Production is expected to start at end of May.

Purchasing Agent's Checklist

ELECTRONICS: Record year looked for with Sales reaching $10 million . . . . . p. 53

WIRE: New product features increased strength and staying power . . . . . p. 55

NICKEL: This year's demand will exceed last year's consumption p. 56

TIRES: Tubeless items now available for all sizes of trucks . . . . . p. 68

Comparison of Prices

(Effective Mar. 8, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Mar. 8 1955	Mar. 1 1955	Feb. 8 1955	Mar. 9 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.79	5.513
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Ternplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. ternes	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.16¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails (per 100 lb.)				
Heavy rails	$4.45	$4.45	$4.45	$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Rerolling billets	$64.00	$64.00	$64.00	$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.797¢	4.634¢

	Mar. 8 1955	Mar. 1 1955	Feb. 8 1955	Mar. 9 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$61.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic, del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$38.50	$38.50	$36.50	$24.50
No. 1 steel, Phila. area	38.75	38.25	36.50	22.50
No. 1 steel, Chicago	34.50	33.50	34.50	23.50
No. 1 bundles, Detroit	29.00	29.00	29.00	16.50
Low phos., Youngstown	37.50	36.50	36.50	26.50
No. 1 mach'y cast, Pittsburgh	43.50	43.50	43.50	41.50
No. 1 mach'y cast, Philadel'a.	44.50	43.50	43.50	39.00
No. 1 mach'y cast, Chicago	45.50	45.50*	45.00	36.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$37.58	$36.75	$35.83	$23.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.38
Foundry coke, prompt	16.75	16.75	16.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	29.875‡
Copper, Lake, Conn.	33.00	33.00	33.00	30.00
Tin, Straits, New York	*90.625*†	91.125*	91.25	90.00
Zinc, East St. Louis	11.50	11.50	11.50	9.25
Lead, St. Louis	14.80	14.80	14.80	12.55
Aluminum, virgin ingot	23.20	23.20	23.20	21.50
Nickel, electrolytic	67.67	67.67	67.67	63.08
Magnesium, ingot	27.75	27.75	27.75	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 159→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B1*	$8.00	$8.50	$9.00	$9.50	.....
Birmingham *R3*	$2.38	$2.88	.....	.....	.....
Birmingham *W9*	$2.38	$2.88	.....	.....	.....
Birmingham *U4*	$2.38	$2.88	$6.50	.....	.....
Buffalo *R3*	$6.00	$6.50	$7.00	.....	.....
Buffalo *I11*	$6.00	$6.50	$7.00	.....	.....
Buffalo *W6*	$6.00	$6.50	$7.00	.....	.....
Chicago *I4*	$6.00	$6.50	$6.50	$7.00	.....
Cleveland *A5*	$6.00	$6.50	$6.50	$7.00	61.00
Cleveland *R3*	$6.00	$6.50	$6.50	.....	.....
Daingerfield *L3*	$2.50	$2.50	$2.50	.....	.....
Duluth *I4*	$6.00	$6.50	$6.50	$7.00	.....
Erie *I4*	$6.00	$6.50	$6.50	$7.00	.....
Everett *M6*	.....	$1.00	$1.50	.....	.....
Fontana *K1*	$2.00	$2.50	.....	.....	.....
Geneva, Utah *C7*	$6.00	$6.50	.....	.....	.....
Granite City *G2*	$7.90	$8.40	$8.90	.....	.....
Hubbard *Y1*	.....	.....	$6.50	.....	.....
Minnequa *C6*	$8.00	$9.00	$9.00	.....	.....
Monessen *P6*	$6.00	.....	.....	.....	.....
Neville Isl. *P4*	$6.00	$6.50	$6.50	.....	.....
N. Tonawanda *T1*	.....	$6.50	$7.00	.....	.....
Pittsburgh *U1*	$6.00	.....	.....	$7.00	.....
Sharpsville *S3*	$6.00	$6.50	$6.50	$7.00	.....
So. Chicago *R3*	$6.00	.....	$6.50	.....	.....
Steelton *B3*	$8.00	$8.50	$9.00	$9.50	64.00
Swedeland *A2*	$8.00	$8.50	$9.00	$9.50	.....
Toledo *I4*	$6.00	$6.50	$6.50	$7.00	.....
Troy, N. Y. *R3*	$8.00	$8.50	$9.00	$9.50	64.00
Youngstown *Y1*	.....	.....	$6.50	$7.00	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery iron: Buffalo, *H1*, $66.25; Jackson, *J1*, *G1*, $65.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347 Cb	410	416	430
Ingots, rerolling	16.75	17.75	19.25	19.00	29.75	23.50	35.50	14.00	—	14.25
Slabs, billets, rerolling	21.00	23.25	25.25	24.50	38.00	30.25	46.75	18.25	—	18.5
Forg. discs, die blocks, rings	39.00	39.00	42.00	41.25	61.75	46.25	—	31.00	31.75	31.7
Billets, forging	30.00	30.25	32.75	31.75	48.25	36.00	54.75	24.00	24.50	24.5
Bars, wires, structurals	35.75	36.00	38.75	38.00	57.25	42.75	64.25	28.75	29.25	29.2
Plates	37.75	38.00	40.25	40.50	60.50	46.50	69.25	30.00	30.50	30.5
Sheets	41.75	42.00	49.25	44.50	64.50	51.25	77.50	34.25	41.25	34.7
Strip, hot-rolled	30.25	32.50	37.25	35.00	55.00	41.75	63.00	26.25	—	27.0
Strip, cold-rolled	38.75	42.00	46.00	44.50	64.50–64.75	51.25–51.50	77.50	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4* Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7* Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*, Syracuse, *C11*.

Market Shows Good Strength

Chicago price rises $1 on No. 1 heavy melting after abnormal low period . . . High steel operating rates and strong export demand keep market tight on all fronts.

◆ MARKET resumed its upward trend again this week following a temporary breathing spell. Prices advanced in several centers under pressure from high ingot rates and export demand.

Chicago price finally broke upward after an unnaturally low period during which the market had withstood the general rise. Mill purchases of heavy melting, bundles and turning grades boosted prices that had already advanced at the broker buying level.

Elsewhere strong domestic and export demand kept the upward move going as Philadelphia led the way with $1.50 boost on No. 1 heavy melting. New York shared in the upward trend, advancing $1 per ton.

Reflecting healthy condition of the market, THE IRON AGE Heavy Melting Steel Scrap Composite rose to $37.58, an increase of 83¢. No easing of pressure on market is seen for near future as operating rates show signs of going even higher.

Commerce Dept. this week issued new restrictions covering scrap exports. The regulations are seen as bringing license applications in line with firm commitments.

Pittsburgh . . . An independent mill this week bought a tonnage. Price paid did not necessarily reflect complete market condition. IRON AGE openhearth prices held steady except for No. 2 bundles which moved up. Shoveling turnings edged up 50¢ per ton to $27.00 and cupola cast was up $1.

Chicago . . . Chicago scrap finally began to move up this week after holding an unnaturally low top price for weeks as scrap market across the nation, including points as close as Detroit and St. Louis, had been showing steady advances. At least 2 mill purchases in the turnings grades as well as mill purchases of heavy melting and bundles, boosted grades that had already advanced at least $1 at the dealer asking price and broker buying levels in the past two weeks. Factory bundles had advanced on broker bids early last week by $1 and as previously reported most steelmaking grades had already advanced at least $0.50 at the dealer selling level. Though No. 2 heavy melting continues to hold back, tonnage purchases of the grade at $32 are increasingly difficult and broker buying at $31.50 and $32 is increasingly common.

Philadelphia . . . On the basis of a sale to a leading consumer, price of No. 1 Heavy Melting advanced $1.50 per ton this week to $40.00 top. Other openhearth grades advanced accordingly. Proposal for qualitative export restrictions still under discussion. Some sources wonder whether anything will come of the proposal.

New York . . . Prices moved up $1 although there is some hesitation on the basis of possible export curbs.

Detroit . . . Despite an apparently strong market last week there has been no mill buying in Detroit and local dealers are still waiting for orders which may not be forthcoming for some time to come. There are indications that at least 2 Detroit mills may not be back in the market this month. Foundry steel and choice machinery cast grades are reported on the strong side this week although standard grades are reported as firm but unchanged.

Cleveland . . . Foundry business showed marked pick-up in Cleveland area last week, taking up slack from steel mill business. One major auto foundry made substantial purchase of 2 ft. foundry steel at $41.50 or $3.50 per ton over previous market. Motor blocks are going for $45-46 and cut structural and plate went for $43 top, $3 over previous sales. Steel mill market remained steady but unchanged with one Valley mill holding up shipments while a Cleveland mill released them. Industrial lists went for $1 over quotations and some special orders were reported moving to Pittsburgh. The price of machine shop turnings in the Youngstown market was incorrectly quoted in the March 3 issue at $26. The correct price was $20 to $21.

Birmingham . . . The steel scrap market continues strong with mills buying good tonnages. Dealers report larger quantities of scrap coming into their yards as a result of higher prices they are able to pay, and good weather. Brokers report exports are taking so much No. 1 steel that electric furnaces are scrambling to buy various grades of open hearth steel.

St. Louis . . . The scrap situation continues good in the St. Louis industrial district. A steady flow of material equals the melt and the steel rate continues at the high rate of 96.2 pct. Prices remain unchanged.

Cincinnati . . . All open hearths at Newport Steel were shut down last week to avoid flood damage from the rampaging Ohio River. Three of 7 had been in operation. Firm's 3 electrics were unaffected. Upsurging foundry business in Cincinnati area pushed foundry grades and random length rails up $1 with increasing market in sight. Industrial lists in area closed at about $1 to $1.50 higher. One mill could find no takers at $34 delivered for No. 1 heavy melting and $25 No. 2 bundles.

Buffalo . . . Prices on No. 2 steel grades and blast furnace items jumped $1.50 a ton on new orders placed by one of area's top mill consumers.

Boston . . . Market tone was less firm but this was not reflected in lower prices. There was less activity but unstripped motor blocks were the only item on which there was no demand at all.

West Coast . . . Ports are busy exporting scrap. An 8000-ton cargo is leaving Portland, Ore., and a ship is loading out of Oakland, Calif., for Japan, with another slated to go later in the month. Mills are buying against this export competition.

THE TEETH in this drag line bucket now are fabricated from 3" sections of USS "T-1" Steel. Teeth are flame-cut, bolt holes are drilled, then teeth are water quenched and tempered to a surface hardness of 388 to 401 Brinell. No all-over machining is required, as it was previously. Flame cutting does not cause steel to crack. "T-1" cuts costs, saves time, improves performance.

How USS "T-1" Steel in Drag Line Bucket Teeth increased service life ten times

This hefty drag line is used to break and load ferromanganese which is made by the Blast Furnace Department of U.S. Steel's Duquesne Works. Ferromanganese is extremely hard and dense, so the bucket teeth must have exceptional resistance to impact abuse and abrasion.

When we bought this machine, the manufacturer used the best steel then available for the job. But still the teeth broke easily – and lasted for only 4 to 8 hours of operation. Replacement down time was frequent and expensive.

Just as an experiment, we tried our new "T-1" Steel in this rugged application. It worked beautifully. Instead of 8 hours, we are getting *80 hours* of service from each set of teeth – ten times more. Down time and replacement costs are about *a tenth* of what they used to be. Naturally we'll continue to use "T-1" Steel in this job, in the entire bucket as well as the teeth.

USS "T-1" Steel can cut costs for you in a wide variety of applications. Write for detailed facts and figures.

USE "T-1" AT HIGH TEMPERATURES. New USS "T-1" Steel has good creep rupture strength up to 900° F. It is being used in heavy-duty parts that operate at high temperatures.

USE "T-1" AT LOW TEMPERATURES. This same steel is amazingly tough at sub-zero temperatures. In pressure vessels, it has survived impacts of 2,000,000 ft. lbs. at 38 degrees below zero F. In addition, it has good resistance to impact abrasion.

USE "T-1" TO CUT FABRICATING COSTS. You have a yield strength of 90,000 psi. in "T-1" yet you can weld or flame cut this steel without pre- or post-heating. Your welds will develop the full 90,000 psi. And you can fabricate parts either in the shop or the field—wherever it is more convenient and less costly. With "T-1" Steel you can save money or improve design—sometimes both—in bridges, pressure vessels, heavy-duty trucks, excavating machines, mine cars, high speed rotating machines, steel mill equipment, and stamping and forging presses.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

USS

S-204

UNITED STATES STEEL

Scrap Prices *(Effective Mar. 8, 1955)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	31.00 to 32.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and ms. turns.	22.00 to 23.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Low phos. punch'gs, plate	41.00 to 42.00
Heavy turnings	35.00 to 36.00
No. 1 RR. hvy. melting	40.00 to 41.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	50.00 to 51.00
RR. steel wheels	44.00 to 45.00
RR. spring steel	44.00 to 45.00
RR. couplers and knuckles	44.00 to 45.00
No. 1 machinery cast.	43.00 to 44.00
Cupola cast	39.00 to 40.00
Heavy breakable cast.	34.00 to 35.00

Chicago

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 factory bundles	36.00 to 37.00
No. 1 dealers' bundles	34.00 to 35.00
No. 2 dealers' bundles	24.00 to 25.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Low phos. forge crops	38.00 to 39.00
Low phos. punch'gs, plate	36.00 to 37.00
Low phos. 2 ft and under	35.00 to 36.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	39.00 to 40.00
Rerolling rails	49.00 to 50.00
Rails 2 ft and under	48.00 to 49.00
Locomotive tires, cut	36.00 to 37.00
Cut boilers & side frames	37.00 to 38.00
Angles and splice bars	43.00 to 44.00
RR. steel car axles	42.00 to 43.00
RR. couplers and knuckles	39.00 to 40.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	34.00 to 35.00
Cast iron brake shoes	34.00 to 35.00
Cast iron car wheels	36.00 to 37.00
Malleable	44.00 to 45.00
Stove plate	35.00 to 36.00

Philadelphia Area

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	35.50 to 36.50
No. 1 bundles	39.50 to 40.00
No. 2 bundles	31.00 to 32.00
Machine shop turn.	21.50 to 22.50
Mixed bor. short turn.	21.50 to 22.50
Cast iron borings	20.50 to 21.50
Shoveling turnings	23.50 to 25.00
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	41.50 to 42.50
Low phos. 2 ft and under	43.00 to 44.00
Low phos. punch'gs	43.00 to 44.00
Elec. furnace bundles	40.00 to 41.00
Heavy turnings	36.00 to 37.00
RR. steel wheels	41.50 to 42.50
RR. spring steel	41.50 to 42.50
Rails 18 in. and under	51.00 to 52.00
Cupola cast	36.00 to 38.00
Heavy breakable cast.	38.00 to 39.00
Cast iron car wheels	44.00 to 45.00
Malleable	44.00 to 45.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	44.00 to 45.00
Charging box cast.	36.00 to 37.00

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	30.50 to 31.00
No. 1 bundles	33.50 to 34.50
No. 2 bundles	27.00 to 28.00
No. 1 busheling	33.50 to 34.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	23.00 to 25.00
Shoveling turnings	23.00 to 25.00
Cast iron borings	23.00 to 25.00
Cut struct'r'l & plates, 2 ft & under	42.00 to 43.00
Drop forge flashings	33.50 to 34.50
Low phos. punch'gs, plate	33.50 to 34.50
Foundry steel, 2 ft & under	40.50 to 41.50
No. 1 RR. heavy melting	34.00 to 35.00
Rails 2 ft and under	47.00 to 48.00
Rails 18 in. and under	49.00 to 50.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	27.00 to 28.00
Railroad cast	45.00 to 46.00
No. 1 machinery cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Malleable	44.00

Youngstown

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	37.00 to 38.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	26.00
Cast iron borings	26.00
Low phos. plate	37.00 to 38.00

Buffalo

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 busheling	32.00 to 33.00
No. 1 bundles	32.00 to 33.00
No. 2 bundles	27.00 to 28.00
Machine shop turn.	20.50 to 21.50
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	22.00 to 23.00
Low phos. plate	35.00 to 36.00
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	41.00 to 42.00
No. 1 cupola cast.	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$28.50 to $29.50
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles, openhearth	28.50 to 29.50
No. 2 bundles	21.00 to 22.00
New busheling	27.00 to 28.00
Drop forge flashings	27.00 to 28.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. punch'gs, plate	28.50 to 29.50
No. 1 cupola cast.	34.00 to 36.00
Heavy breakable cast.	25.00 to 27.00
Stove plate	30.00 to 32.00
Automotive cast.	38.00 to 40.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	24.50 to 25.50
Machine shop turn.	15.50 to 16.50
Cast. iron borings	15.50 to 16.50
Shoveling turnings	17.00 to 18.00
No. 1 RR. hvy. melting	35.00 to 36.00
Rails, random lengths	40.00 to 41.00
Rails, 18 in. and under	47.00 to 48.00
Locomotive, tires uncut	35.50 to 36.50
Angles and splice bars	35.50 to 36.50
Std. steel car axles	35.50 to 36.50
RR. spring steel	37.00 to 38.00
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	33.00 to 34.00
Cast iron brake shoes	29.00 to 30.00
Stove plate	34.00 to 35.00
Cast iron car wheels	34.50 to 35.50
Malleable	35.00 to 36.00
Unstripped motor blocks	32.50 to 33.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	28.00 to 29.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	28.00 to 29.00
Elec. furnace, 3 ft & under	30.00 to 32.00
Machine shop turn.	11.00 to 12.00
Mixed. bor. and short turn.	12.00 to 13.00
Shoveling turnings	13.00 to 14.00
Clean cast chem. borings	18.00 to 19.00
No. 1 machinery cast.	29.00 to 30.00
Mixed cupola cast.	27.00 to 28.00
Heavy breakable cast.	26.00 to 27.00
Stove plate	25.00 to 26.00
Unstripped motor blocks	18.00 to 19.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	30.00
No. 2 bundles	$25.50 to 26.50
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	14.00 to 15.00
Clean cast chem. borings	22.00 to 23.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	28.00 to 29.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	32.00 to 33.00
Bar crops and plate	36.00 to 37.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	39.00 to 40.00
Rails, 18 in. and under	42.00 to 43.00
Angles & splice bars	40.00 to 41.00
Rerolling rails	43.00 to 44.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	35.50 to 36.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	32.00 to 33.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.50 to 20.50
Cast iron borings	19.00 to 20.00
Low phos., 18 in. & under	37.00 to 38.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	$27.00
No. 2 hvy. melting	25.00
No. 1 bundles	26.00
No. 2 bundles	22.00
No. 3 bundles	18.00
Machine shop turn.	8.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	27.00
No. 1 cupola cast.	40.00

Los Angeles

No. 1 hvy. melting	$28.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	27.00 to 29.00
No. 2 bundles	22.00 to 23.00
No. 3 bundles	18.00 to 20.00
Machine shop turn.	8.00
Shoveling turnings	10.00
Cast iron borings	10.00
Elec. furn. 1 ft. and under	28.00 to 30.00
No. 1 RR. hvy. melting	28.00 to 30.00
No. 1 cupola cast.	$41.00 to 42.00

Seattle

No. 1 hvy. melting	$31.00
No. 2 hvy. melting	27.00
No. 1 bundles	23.00
No. 2 bundles	20.00
No. 3 bundles	16.00
No. 1 cupola cast.	35.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 bundles	32.00
No. 2 bundles	24.00
Mixed steel scrap	24.00
Bushelings	27.00
Bush., new fact prep'd	30.00
Bush., new fact unprep'd	26.00
Short steel turnings	12.00
Mixed bor. and turn.	12.00
Rails, rerolling	41.00
Cast scrap	$42.00 to 43.00

A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

Luria Brothers and Company, Inc.

MAIN OFFICE

LINCOLN-LIBERTY BLDG.

Philadelphia 7, Penna.

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EXPORTS-IMPORTS — LIVINGSTON & SOUTHARD, INC. 99 Park Ave. New York, N. Y. Cable Address: FORETRACO

Check on Aluminum Shortage

Government will look into question of whether or not there is an aluminum shortage . . . Third round expansion rumors start up again . . . Not given very good chance at present.

◆ CONCERN over conflicting reports about whether or not there is an aluminum shortage, plus an increasing number of complaints from aluminum fabricators is causing the government to make a special investigation of the aluminum supply problem.

The situation is at best confused. There seems to be general agreement on the belief that there is a shortage of secondary metal—but the government frankly admits it isn't sure whether or not there is a real lack of primary production.

Early this week Business & Defense Services Administration officials got together with the Primary Aluminum Producers Committee to talk over the supply situation. It was hoped this confab would help clarify the matter.

Evidence that consumption is gaining faster than production has started the rumor of a possible third round aluminum expansion again. Proposal for a third round buildup is believed to have reached the discussion stage and it is thought entirely new companies have been mentioned as possibles for aluminum production contracts.

Most industry sources, however, are doubtful that there will be a third round of expansion for aluminum unless the government offers considerably more assistance than was forthcoming the last time the subject was under consideration. Further dampening prospects of another aluminum buildup is the fact that power situation is even worse than it was last year when the idea was ruled out.

COPPER . . . Settlement of the strike at copper mines in Northern Rhodesia had little effect on the market. Prices in the London market eased off a little more than a cent per lb on spot and less than a cent for futures. But then the price bounced back up again. Many in the trade believe the London price is too high, but a big price break should not be expected.

The already tight supply of copper was further strained by the strike in Northern Rhodesia which knocked out about 2 months production. Current output won't be available in electrolytic form until around June.

Quota for exports of copper scrap and copper-base alloy scrap in the second quarter is to drop below the quota set for the current period.

A total of 5000 tons of unalloyed copper scrap, and 7000 tons (copper content) of copper-base alloy scrap is the quota set by the Commerce Dept.'s Bureau of Foreign Commerce. Quota for February and March was 6000 tons for each category. Copper-weld rods will not be restricted. Licensing of copper-base alloy ingots will be restricted to historical levels.

LEAD . . . Stocks of refined lead are at their lowest level in more than a year. Latest figures from American Bureau of Metal Statistics show inventories of refined lead in the hands of smelters and refiners dropped 7410 tons during January to a level of 69,980 tons. Previous low was hit Jan. 1, 1954 when stocks totaled 65,036 tons.

There was very little change in antimonial lead stocks which stood at 14,902 tons as of the first of February compared to 14,789 tons on Jan. 1.

Some producers report they have already placed about 80 pct of the lead they will turn out during March. Outlook is that lead sales for shipment during March will be even better than the highly satisfactory February figure.

Prices remained firm.

ZINC . . . Market is expected to remain slow but firm for a short while as zinc consumers have by and large covered their needs for the current month. Only grade which has not suffered from a slump in demand is Special High — as there were still some zinc buyers seeking this grade for shipment this month.

MAGNESIUM . . . January shipments of magnesium mill products totaled 1,776,000 lb, reports Commerce Dept. The January figure is 6 pct above volume of the previous month when 1,673,000 lb of mill products were shipped.

ALUMINUM . . . Market remained relatively calm through last week. Despite current high price level, demand for smelter aluminum alloys remains firm. Smelters are operating on a 6-day week basis trying to keep order backlogs from mushrooming too much above the current 32,500 ton level.

Prices were steady for the most part with the exception of increases for 43 and 13 grades. Aluminum scrap continues in tight supply.

TITANIUM . . . Stockholders of Horizons Titanium Corp. and Horizons Zirconium Corp. will vote on a merger proposal on Mar. 22. Neither company has shares in the other but Horizons, Inc. is the largest stockholder in each. If the merger is approved Horizons, Inc. will give the merged company rights to its electrolytic process for producing tantalum, columbium, chromium and vanadium.

Currently, Horizons Titanium is establishing a pilot plant to test the practicality of producing titanium by the electrolytic method. If this proves successful, company spokesmen believe they will be able to produce a better grade titanium at considerably lower cost.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Mar. 2	Mar. 3	Mar. 4	Mar. 5	Mar. 7	Mar. 8
Copper, electro, Conn.	33.00	33.00	33.00	33.00	33.00	33.00
Copper Lake, delivered	33.00	33.00	33.00	33.00	33.00	33.00
Tin, Straits, New York	91.00	90.75	90.875	90.875	90.75	90.625*
Zinc, East St. Louis	11.50	11.50	11.50	11.50	11.50	11.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices *Tentative

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet			Plate
	0.032 in.	0.081 in.	0.136-0.249 in.	0.250-3.000 in.
1100, 3003	39.1	37.1	35.9	35.5
3004	44.0	39.8	38.1	37.6
5052	46.7	41.9	40.2	39.3
2024-O, -OAL	49.4	40.8	39.3	39.4
7075-O, -OAL	60.8	49.1	46.8	46.8

Extruded Solid Shapes: Shape factors 1 to 6, 38.7¢ to 86.7¢; 12 to 14, 39.4¢ to $1.04; 24 to 26, 42.2¢ to $1.35; 36 to 38, 49.8¢ to $1.97.

Rod, Round: Rolled, 1.064-4-5 in. 1100-F, 48.6¢ to 40.1¢; cold finished, 0.375-3.499 in., 1100-F, 47.9¢ to 42.4¢.

Screw Machine Stock: Rounds, 2011-T3, ⅛-11/32 in., 63.5¢ to 50.1¢; ⅜-1½ in., 49.9¢ to 46.9¢; 1 9/16-3 in., 45.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 35.8¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.3¢ to 44.7¢; 6061-T4, 59.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1¼-2 in., 44.4¢ to 64.8¢; 2-4 in., 40.3¢ to 54.6¢; 4-6 in., 40.8¢ to 49.8¢; 6-9 in., 41.4¢ to 52.1¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42⅜ x 60-in., $2.998; x 96-in., $4.801; x 120-in., $6.002; x 144-in., $7.202. Coiled sheet, per lb, 0.019 in. x 28 in., 30.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 56¢; 3/16 in., 67¢; ½ in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ⅜ to ¾ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD ¾ to 5/16 in., $1.48; 5/16 to ⅝ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $9; Forgings, $9.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	78	99
Strip, CR	102	87	125
Rod, Bar, HR	87	69	93
Angles, HR	87	69	93
Plate, HR	97	82	95
Seamless Tube	122	108	153
Shot, Blocks		65	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	49.79		51.86
Copper, h-r	51.76	48.11	
Copper, drawn		49.36	
Low brass	47.35	47.29	
Yellow brass	44.27	44.21	
Red brass	48.44	48.38	
Naval brass		42.49	43.75
Leaded brass	44.27	35.36	41.41
Com. bronze	50.08	50.02	
Mang. bronze		46.02	47.58
Phos. bronze	70.12	70.62	
Muntz metal		42.15	43.40
Ni silver, 10 pct	58.35	60.58	

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.71
Rod, bar, wire	1.68

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	23.20
Aluminum pig	21.50
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb conta'd Be	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	33.00
Copper, Lake, delivered	33.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$110 to $120
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	27.00
ingot	27.75
Magnesium, sticks, 100 to 500 lb,	46.00 to 48.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$322 to $324
Nickel electro, f.o.b. N. Y. warehouse	67.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$18 to $20
Platinum, dollars per troy oz.	$78 to $80
Silver, New York, cents per troy oz.	85.25
Tin, New York	90.75
Titanium, sponge, grade A-1,	$4.00 to $4.50
Zinc, East St. Louis	11.50
Zinc, New York	12.00
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	34.00
No. 120	33.50
No. 123	33.00
80-10-10 ingot	
No. 305	38.00
No. 315	35.75
88-10-2 ingot	
No. 210	47.75
No. 215	44.25
No. 245	39.25
Yellow ingot	
No. 405	29.75
Manganese bronze	
No. 421	32.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	31.50-32.50
0.60 copper, max.	31.25-32.25
Piston alloys (No. 122 type)	30.00-31.50
No. 12 alum. (No. 2 grade)	29.25-30.25
108 alloy	30.00-31.00
195 alloy	31.00-32.50
13 alloy (0.60 copper max.)	31.25-32.25
ASX-679	30.00-31.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	29.50-32.50
Grade 2—92-95%	28.50-31.50
Grade 3—90-92%	27.50-30.50
Grade 4—85-90%	27.00-29.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.92
Electrodeposited	39.78
Flat rolled	45.42
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	90.50*
Cadmium	$1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	62.00
Copper sulphate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	31.25*
Nickel chloride, 300 to 400 lb	43.50*
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

*Effective Jan. 2.

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	21⅞	20⅛
Red brass	25½	24⅝
Comm. bronze	26⅝	25⅞
Mang. bronze	20⅝	19⅛
Yellow brass rod ends	21⅝	

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	33⅛
No. 2 copper wire	33
Light copper	30¼
*Refinery brass	28

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	32½—33½
No. 2 copper wire	31 —32
Light copper	29 —30
No. 1 composition	27½
No. 1 comp. turnings	27¼
Rolled brass	21½
Brass pipe	23
Radiators	22 —22¼
Aluminum	
Mixed old cast	18½—20
Mixed new clips	17½—20
Mixed turnings, dry	18½—20
Pots and pans	18½—19

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	30 —30½
No. 2 heavy copper and wire	29 —29½
Light copper	27 —27½
New type shell cuttings	26 —26½
Auto radiators (unsweated)	19 —19½
No. 1 composition	24 —24½
No. 1 composition turnings	23 —23½
Unlined red car boxes	19½—20
Cocks and faucets	20 —20½
Mixed heavy yellow brass	17½—18
Old rolled brass	18 —18½
Brass pipe	20 —20½
New soft brass clippings	21½—22
Brass rod ends	19 —20
No. 1 brass rod turnings	18½—19

Aluminum

Alum. pistons and struts	11½—12½
Aluminum crankcases	15 —16
1100 (2S) aluminum clippings	18 —18½
Ald sheet and utensils	15½—16
Borings and turnings	9½—10
Misc. cast aluminum	14½—15
2024 (24s) clippings	15 —15⅛

Zinc

New zinc clippings	7
Old zinc	5½
Zinc routings	3½— 3¾
Old die cast scrap	3¼— 3½

Nickel and Monel

Pure nickel clippings	57 —60
Clean nickel turnings	40 —43
Nickel anodes	57 —60
Nickel rod ends	57 —60
New Monel clippings	26 —28
Clean Monel turnings	20 —21
Old sheet Monel	25 —26
Nickel silver clippings, mixed	16 —17
Nickel silver turnings, mixed	14 —15

Lead

Soft scrap lead	11½—11⅝
Battery plates (dry)	6½— 6¾
Batteries, acid free	4⅛

Magnesium

Segregated solids	18½—19
Castings	17½—18

Miscellaneous

Block tin	70 —75
No. 1 pewter	50 —55
No. 1 auto babbitt	45
Mixed common babbitt	12 —12⅛
Solder joints	17
Siphon tops	45
Small foundry type	16½—16¾
Monotype	15 —15⅛
Lino. and stereotype	13½—14
Electrotype	12¼—12½
Hand picked type shells	9½—10
Lino. and stereo. dross	8⅛
Electro dross	5

IRON AGE

STEEL PRICES

(Effective Mar. 8, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$86.00 *B3*		4.30 *B3*	6.45 *B3*	4.30 *B3*						
	Buffalo, N. Y.	$64.00 *B3*	$78.00 *B3, R3*	$86.00 *B3, R3*	5.075 *B3*	4.30 *B3*	6.45 *B3*	4.30 *B3*	4.05 *B3,R3*	5.75 *B5,R7*	6.15 *B3*	8.425 *B3*		
	Claymont, Del.													
	Centerville, Pa.													
	Conshohocken, Pa.								4.10 *A2*	5.80 *A2*	6.15 *A2*			
	New Bedford, Mass.									6.20 *R6*				
	Johnstown, Pa.	$64.00 *B3*	$78.00 *B3*	$86.00 *B3*		4.30 *B3*	6.45 *B3*		4.05 *B3*					
	Fairless, Pa.													
	New Haven, Conn.									6.20 *D1* 6.50 *A5*				
	Phoenixville, Pa.					3.95 *P2*		4.30 *P2*						
	Sparrows Pt., Md.								4.05 *B3*	5.75 *B3*	6.15 *B3*	8.425 *B3*		
	Bridgeport, Wallingford, Conn.	$69.00 *N8*	$83.00 *N8*						4.35 *N8*	6.20 *W1*			7.80 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.30 *N7* 6.60 *A5*				12.75 *A5* 12.80 *N7*
MIDDLE WEST	Alton, Ill.								4.225 *L1*					
	Ashland, Ky.								4.05 *A7*					
	Canton-Massillon, Dover, Ohio		$80.00 *R3*	$86.00 *R3, T5*										12.45 *G4*
	Chicago, Ill.	$64.00 *U1*	$78.00 *R3, U1,W8*	$86.00 *U1, W8,R3*	5.075 *U1*	4.25 *U1, W8*	6.40 *U1, Y1*	4.25 *U1*	4.05 *A1,N4 W8*	5.85 *A1*				
	Cleveland, Ohio									5.75 *A5,J3*		8.60 *A5*		12.45 *A5*
	Detroit, Mich.			$86.00 *R5*					4.15 *G3,M2*	5.85 *D1,D2, G3,M2,P11*	6.25 *G3*	8.70 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$64.00 *U1*	$78.00 *U1*	$86.00 *U1, Y1*	5.075 *I3*	4.25 *I3, U1*	6.40 *U1, I3*		4.05 *I3, U1,Y1*	5.85 *I3*	6.15 *U1, I3,Y1*	8.60 *Y1*	6.70 *U1, Y1*	
	Sterling, Ill.								4.15 *N4*					
	Indianapolis, Ind.									5.90 *C5*				
	Newport, Ky.												6.70 *Y5*	
	Middletown, Ohio									5.75 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								4.05 *S1,R3*	5.75 *S1,R3, T4*	6.15 *S1, R3*	8.60 *S1, R3*	6.70 *S1*	12.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$64.00 *U1, J3*	$78.00 *J3, U1,C11*	$86.00 *U1, C11*	5.075 *U1*	4.25 *J3, U1*	6.40 *J3, U1*	4.25 *U1*	4.05 *P6*	5.75 *B4,J3*			6.70 *S9*	12.45 *S9*
	Portsmouth, Ohio								4.05 *P7*	5.75 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.25 *W3*			4.05 *W3*	5.75 *F3,W3*	6.15 *W3*	8.60 *W3*		
	Youngstown, Ohio		$78.00 *C10*	$86.00 *Y1, C10*		4.25 *Y1*	6.40 *Y1*		4.05 *U1,Y1*	5.75 *Y1,C5*	6.15 *U1, Y1*	8.60 *Y1*	6.70 *U1, Y1*	12.45 *C5*
WEST	Fontana, Cal.	$72.00 *K1*	$86.00 *K1*	$105.00 *K1*		4.90 *K1*	7.05 *K1*	5.25 *K1*	4.825 *K1*	7.65 *K1*	7.25 *K1*		8.10 *K1*	14.55 *K1*
	Geneva, Utah		$78.00 *C7*			4.25 *C7*	6.40 *C7*							
	Kansas City, Mo.					4.30 *S2*	6.45 *S2*				6.40 *S2*		6.95 *S2*	
	Los Angeles, Torrance, Cal.		$87.50 *B2*	$106.00 *B2*		4.95 *B2, C7*	7.10 *B2*		4.80 *B2,C7*	7.80 *C1*				
	Minnequa, Colo.					4.70 *C6*			5.15 *C6*					
	Portland, Ore.					5.80 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$87.50 *B2*			4.90 *B2* 4.95 *P9*	7.05 *B2*		4.80 *B2,C7*					
	Seattle, Wash.		$91.50 *B2*			5.00 *B2*	7.15 *B2*		5.05 *B2, P12*					
SOUTH	Atlanta, Ga.								4.25 *A11*					
	Fairfield, Ala. City, Birmingham, Ala.	$64.00 *T2*	$78.00 *T2*			4.25 *C16, R3,T2*	6.40 *T2*		4.05 *R3, T2,C16*		6.15 *T2*			
	Houston, Tex.		$83.00 *S2*	$91.00 *S2*		4.30 *S2*	6.45 *S2*				6.40 *S2*		6.95 *S2*	

IRON AGE

STEEL PRICES

(Effective Mar. 8, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & heavier	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.05 *B3*	4.95 *B3*				6.10 *B3*	7.50 *B3*			4.675 *W6*	† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.10. Differential 1.00 lb./0.25 lb. add 85¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.10 *A2*	5.00 *A2*				6.15 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										4.675 *B3*			
	Fairless, Pa.	4.10 *U1*	5.00 *U1*				6.15 *U1*	7.55 *U1*				$8.90 *U1*	$7.60 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.05 *B3*	4.95 *B3*	5.45 *B3*			6.10 *B3*	7.50 *B3*	8.20 *B3*		4.775 *B3*	$8.90 *B3*	$7.60 *B3*	
	Worcester, Mass.										4.975 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill										4.85 *L1*			
	Ashland, Ky.	4.05 *A7*		5.45 *A7*	5.375 *A7*									
	Canton-Massillon, Dover, Ohio			5.45 *R1,R3*						5.175 *R1*				
	Chicago, Joliet, Ill.	4.05 *A1, W8*					6.10 *U1*				4.675 *A5, N4,R3*			
	Sterling, Ill.										4.775 *N4*			
	Cleveland, Ohio	4.05 *J3, R3*	4.95 *J3, R3*		5.375 *R3*		6.10 *J3, R3*	7.50 *J3, R3*			4.675 *A5*			
	Detroit, Mich.	4.15 *G3, M2*	5.05 *G3*				6.20 *G3*	7.60 *G3*						
	Newport, Ky.	4.05 *N5*	4.95 *N5*	5.45 *N5*										
	Gary, Ind. Harbor, Indiana	4.05 *I3, U1,Y1*	4.95 *I3, U1,Y1*	5.45 *U1, I3*	5.375 *I3, U1*	5.85 *U1*	6.10 *U1, I3,Y1*	7.50 *U1, Y1*			4.675 *Y1*	$8.80 *I3, U1,Y1*	$7.50 *I3, U1,Y1*	6.20 *U1, Y1*
	Granite City, Ill.	4.25 *G2*	5.15 *G2*	5.65 *G2*	5.575 *G2*								$7.60 *G2*	6.30 *G2*
	Kokomo, Ind.	4.15 *C9*		5.55 *C9*						5.20 *C9*	4.775 *C9*			
	Mansfield, Ohio					5.85 *E2*				5.175 *E2*				
	Middletown, Ohio		4.95 *A7*		5.375 *A7*	5.85 *A7*								
	Niles, Ohio Sharon, Pa.	4.05 *S1,R3* 5.30 *N3*	4.95 *R3* 5.975 *N3*	5.45 *N3*	6.725 *N3*	5.85 *N3*	6.10 *S1,R3*	7.50 *R3*				$8.80 *R3*	$7.50 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.05 *J3, U1,P6*	4.95 *J3, U1,P6*	5.45 *U1*	5.375 *U1*		6.10 *J3, U1*	7.50 *J3, U1*	8.20 *U1*		4.675 *A5* 4.675 *P6*	$8.80 *J3, U1*	$7.50 *J3, U1*	6.20 *U1*
	Portsmouth, Ohio	4.05 *P7*	4.95 *P7*								4.675 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.05 *W3, W5*	4.95 *W3, W5,F3*	5.45 *W3, W5*		5.85 *W3, W5*	6.10 *W3*	7.50 *W3*				$8.80 *W3, W5*	$7.50 *W3, W5*	6.20 *F3, W5*
	Youngstown, Ohio	4.05 *U1, Y1*	4.95 *Y1*		5.375 *Y1*		6.10 *U1, Y1*	7.50 *Y1*			4.675 *Y1*			
WEST	Fontana, Cal.	4.825 *K1*	5.05 *K1*				6.875 *K1*	8.55 *K1*			5.475 *K1*			
	Geneva, Utah	4.15 *C7*												
	Kansas City, Mo.										4.925 *S2*			
	Los Angeles, Torrance, Cal.										5.475 *C7, B2*			
	Minnequa, Colo.										4.925 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	4.75 *C7*	5.90 *C7*	6.20 *C7*							5.325 *C7*	$9.55 *C7*	$8.25 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.05 *R3, T2*	4.95 *T2*	5.45 *R3, T2*			6.10 *T2*			5.25 *R3*	4.675 *T2, R3*	$8.90 *T2*	$7.60 *T2*	
	Houston, Texas										4.925 *S2*			

IRON AGE

STEEL PRICES

(Effective Mar. 8, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'rs. Bright
EAST	Bethlehem, Pa.				5.075 *B3*	6.625 *B3*	6.45 *B3*					
	Buffalo, N. Y.	4.30 *B3,R3*	4.30 *B3,R3*	5.45 *B5*	5.075 *B3,R3*	6.625 *B3,B5*	6.45 *B3*	4.225 *B3,R3*			6.45 *B3*	5.75 *W6*
	Claymont, Del.							4.225 *C4*		5.80 *C4*		
	Centreville, Pa.							4.225 *L4*		5.80 *L4*	6.45 *L4*	
	Conshohocken, Pa.							4.225 *A2*	5.275 *A2*		6.45 *A2*	
	Harrisburg, Pa.							4.225 *C3*	5.275 *C3*			
	Hartford, Conn.			5.90 *R3*		6.925 *R3*						
	Johnstown, Pa.	4.30 *B3*	4.30 *B3*		5.075 *B3*		6.45 *B3*	4.225 *B3*		5.80 *B3*	6.45 *B3*	5.75 *B3*
	Fairless, Pa.	4.45 *U1*	4.45 *U1*		5.225 *U1*							
	Newark, N. J.			5.85 *W10*		6.80 *W10*						
	Camden, N. J.			5.85 *P10*								
	Bridgeport, Putnam, Conn.	4.55 *N8*		5.95 *W10*	5.225 *N8*			4.475 *N8*				
	Sparrows Pt., Md.		4.30 *B3*					4.225 *B3*		5.80 *B3*	6.45 *B3*	5.85 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			5.85 *W11* 5.95 *B5,C14*		6.925 *A5,B5*						6.05 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.925 *L1*
	Ashland, Newport, Ky.							4.225 *A7,N5*		5.80 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.40 *R3*		5.40 *R2,R3*	5.075 *R3,T5*	6.625 *R2,R3, T5*		4.225 *E2*				
	Chicago, Joliet, Ill.	4.30 *U1, N4,W8,R3*	4.30 *N4,R3*	5.40 *A5,W10, W8,B5,L2*	5.075 *U1,R3, W8*	6.625 *A5,W8, W10,L2,B5*		4.225 *U1,W8, I5,A1,R3*	5.275 *U1*	5.80 *U1*	6.45 *U1*	5.75 *A5, R3,N4,W7*
	Cleveland, Ohio	4.30 *R3*	4.30 *R3*	5.40 *A5,C13*		6.625 *A5,C13*	6.45 *R3*	4.225 *J3,R3*	5.275 *J3*		6.45 *J3,R3*	5.75 *A5, C13*
	Detroit, Mich.	4.40 *G3* 4.45 *R3*		5.40 *R5* 5.60 *B5,P8* 5.65 *P3*	5.075 *R5* 5.175 *G3*	6.625 *R5* 6.825 *B5,P3, P8*	6.55 *G3*	4.325 *G3*			6.55 *G3*	
	Duluth, Minn.											5.75 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.30 *I3, U1, Y1*	4.30 *I3, U1, Y1*	5.40 *M5,R3*	5.075 *I3, U1, Y1*	6.625 *M5, R3*	6.45 *U1,I3, Y1*	4.225 *I3, U1,Y1*	5.275 *I3*	5.80 *U1,Y1*	6.45 *U1,I3, Y1*	5.85 *M4*
	Granite City, Ill.							4.425 *G2*				
	Kokomo, Ind.											5.85 *C9*
	Sterling, Ill.	4.40 *N4*	4.40 *N4*									5.85 *N4*
	Niles, Ohio Sharon, Pa.	4.30 *R3*					6.45 *R3*	4.225 *S1,R3*		5.80 *S1*	6.45 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.30 *J3, U1, C11*	4.30 *J3, U1*	5.40 *A5,C8, C11,J3, W10,B4,R3*	5.075 *U1,C11*	6.625 *A5,C11, W10,C8,R3*	6.45 *J3, U1*	4.225 *J3, U1*	5.275 *U1*	5.80 *U1*	6.45 *J3, U1*	5.75 *A5,J3, P6*
	Portsmouth, Ohio											5.75 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.30 *W3*						4.225 *W3, W5*				
	Youngstown, Ohio	4.30 *U1,Y1, C10,R3*	4.30 *U1,Y1, R3*	5.40 *F2,Y1, C10*	5.075 *U1,Y1, C10*	6.625 *Y1,C10* 6.665 *F2*	6.45 *U1,Y1*	4.225 *U1,Y1, R3*		5.80 *Y1*	6.45 *Y1*	5.75 *Y1*
WEST	Emeryville, Cal.	5.05 *J5*	5.05 *J5*									
	Fontana, Cal.	5.00 *K1*	5.00 *K1*		6.125 *K1*		7.70 *K1*	4.875 *K1*		6.45 *K1*	7.15 *K1*	
	Geneva, Utah							4.225 *C7*			6.45 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*					6.00 *S2*
	Los Angeles, Torrance, Cal.	5.00 *B2,C7*	5.00 *B2,C7*	6.05 *R3*	6.125 *B2*		7.15 *B2*					6.70 *B2*
	Minnequa, Colo.	4.75 *C6*	4.75 *C6*					5.075 *C6*				6.00 *C6*
	Portland, Ore.	5.05 *O2*	5.05 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.00 *C7,P9* 5.05 *B2*	5.00 *C7,P9* 5.05 *B2*				7.20 *B2*					6.70 *C7*
	Seattle, Wash.	5.05 *B2,P12, N6*	5.05 *B2,P12*				7.20 *B2*	5.125 *B2*		6.70 *B2*	7.35 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.95 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.30 *T2,C16, R3*	4.30 *T2,C16, R3*				6.45 *T2*	4.225 *T2,R3*			6.45 *T2*	5.75 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*	4.55 *L3* 4.275 *S2*		5.85 *S2*	6.50 *S2*	6.00 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $280 per net ton.

	BUTTWELD														SEAMLESS							
	⅛ in.		¼ in.		1 in.		1¼ in.		1½ in.		2 in.		2½-3 in.		2 in.		2½ in.		3 in.		3½-4 in.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	10.75	W4.5	13.75	W8.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
Alton, Ill. *L1*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
Wheeling *W5*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
Indiana Harbor *Y1*	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	14.25	.....	18.25	.....	20.25	.....	20.75	.....	21.25	.....	21.75	.....	22.25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	23.5	18.75
Alton, Ill. *L1*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.25	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	23.5	18.75
Wheeling *W5*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	23.5	18.75
Indiana Harbor *Y1*	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	23.5	18.

Threads only, buttweld and seamless 2½ pt higher discount Plain ends, buttweld and seamless, 3-in. and under, 4½ pt. higher discount. Buttweld jobbers discount, 5 pct.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range at over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

Steel Prices

(Effective Mar. 6, 1955)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.45	5.35	5.425				
So. Chicago *R3*				7.30			
Encley *T2*	4.45	5.35					
Fairfield *T2*		5.35		7.30		5.275	
Gary *U1*	4.45	5.35				5.275	
Ind. Harbor *I3*	4.45		5.425	7.30		5.275	
Johnstown *B3*		5.35					
Joliet *U1*		5.35	5.425				
Kansas City *S2*				7.30			11.50
Lackawanna *B3*	4.45	5.35	5.425			5.275	
Minnequa *C6*	4.45	5.85	5.425	7.30		5.275	11.50
Pittsburgh *O1*					11.00		11.50
Pittsburgh *P5*					11.00		11.50
Pittsburgh *J3*				7.30			
Seattle *B2*				7.80		5.425	12.00
Steelton *B3*	4.45		5.425			5.275	
Struthers *Y1*				7.30			
Torrance *C7*						5.425	
Williamsport *S5*		5.35					
Youngstown *R3*				7.30			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.025	8.225	
Armature	8.50	8.75	9.25
Elect.	9.10	9.35	9.85
Motor	10.10	10.35	10.85
Dynamo	11.00	11.25	11.75
Trans. 72	11.95	12.20	12.70
Trans. 65	12.50	Grain Oriented	
Trans. 58	13.00	Trans. 80	16.60
Trans. 52	14.00	Trans. 73	17.10

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*33.60	
Washington, Pa., *J2*	.....	
Claymont, Del., *C4*	.....	
New Castle, Ind., *I2*	.....	32.50
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	39.50	
Inconel-carbon		
10 pct., Coatesville, Pa., *L4*	47.90	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	40.80	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire ¢/lb.	Merch. Wire Am'ld ¢/lb.	Merch. Wire* Galv. ¢/lb.
Alabama City *R3*	137	146		155	159	6.90	7.30
Aliquippa, Pa. *J3*	137	149			156	6.90	7.425
Atlanta *A8*	139	151		157	164	7.00	7.525
Bartonville *K2*	139	151		157	164	7.00	7.55
Buffalo *W6*						6.90	7.30
Chicago, Ill. *N4*	137	149		155	162	6.90	7.45
Cleveland *A6*	142						
Cleveland *A5*						6.90	
Crawfordsville *M4*	139	151		157	159	7.00	7.55
Donora, Pa. *A5*	137	146		155	159	6.90	7.30
Duluth *A5*	137	146	150	155	159	6.90	7.30
Fairfield, Ala. *T2*	137	146		155	159	6.90	7.30
Galveston *D4*	139						
Houston *S2*	142	154			164	7.15	7.70
Johnstown, Pa. *B3*	137	149			162	6.90	7.45
Joliet, Ill. *A5*	137	146		155	159	6.90	7.30
Kokomo, Ind. *C9*	139	148		157	161	7.00	7.55
Los Angeles *B2*						7.85	
Kansas City *S2*	142	158		167	164	7.15	7.90
Minnequa *C6*	142	151	155	160	164	7.15	7.55
Monessen *P6*	137	151			163	6.90	7.45
Moline, Ill. *R3*			145				
Pittsburg, Cal. *C7*	156	169		179	179	7.85	8.25
Portsmouth *P7*						6.90	7.90
Rankin, Pa. *A5*	137	146			159	6.90	7.30
So. Chicago *R3*	137	146	145	155	159	6.90	7.30
S. San Francisco *C6*					179		
Sparrows Pt. *B3*	139			157	164	7.00	7.55
Struthers, O. *Y1*						6.90	7.55
Worcester *A5*	143					7.20	
Williamsport, Pa. *S5*			150				

Cut Nails, carloads, base $8.30 per keg at Conshohocken, Pa. (*A2*).

* **Alabama City and So. Chicago don't include zinc extra. Galvanized products computed with zinc at 11.0¢ per lb.**

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, New Britain, Conn. *N8*	5.75	8.05	9.00	11.15	13.85
Buffalo, N. Y. *R7*	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. *S9*	.....	8.05	9.00	11.15	13.85
Cleveland *A5*	5.75	8.05	9.00	11.15	13.85
Detroit *D1*	5.85	8.25	9.20	10.95	.....
Detroit *D2*	5.85	8.25	9.20	.....	.....
Harrison, N. J. *C11*	.....	.....	9.30	11.45	14.15
Indianapolis *C5*	6.00	8.20	9.00	11.15	13.85
New Castle, Pa. *B4*	5.75	8.05	9.00	10.95	.....
New Haven, Conn. *D1*	6.20	8.35	9.30	11.25	.....
Pawtucket, R. I. *N7*	6.30	8.35	9.30	11.45	14.15
Riverdale, Ill. *A1*	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. *S1*	5.75	8.05	9.00	11.15	13.85
Trenton *R4*	.....	8.35	9.30	11.25	13.40
Wallingford *W1*	6.20	8.35	9.30	11.45	14.15
Warren, Ohio *T4*	5.75	8.05	9.00	11.15	13.85
Weirton, W. Va. *W3*	5.85	8.05	9.00	10.95	13.25
Worcester, Mass. *A5*	6.60	8.35	9.30	11.45	14.15
Youngstown *C5*	5.85	8.05	9.00	11.15	13.85

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.48	32.95
	2½	12	38.15	45.74	37.00	44.36
	3	12	44.05	52.82	42.72	51.23
	3½	11	51.43	61.66	49.88	59.81
	4	10	68.29	81.88	66.24	79.42
National Tube	2	13	28.33	33.97	27.48	.....
	2½	12	38.15	45.74	37.00	.....
	3	12	44.05	52.82	42.72	.....
	3½	11	51.43	61.66	49.88	.....
	4	10	68.29	81.88	66.24	.....
Pittsburgh Steel	2	13	28.33	33.97	.....	.....
	2½	12	38.15	45.74	.....	.....
	3	12	44.05	52.82	.....	.....
	3½	11	51.43	61.66	.....	.....
	4	10	68.29	81.88	.....	.....

WAREHOUSES

Base price, f.o.b. dollars per 100 lb.,

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: As rolled A 4615 As rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	$.20	6.02	7.51	7.78	6.69	.....	6.37	6.72	6.68	8.32	.....	.....	.....	.....
Birmingham	.15	6.35-6.50	7.35-8.10	8.25-9.00	6.80	9.60	6.65	6.65	6.50	9.00	.....	.....	.....	.....
Boston	.10	7.23	8.23	9.42-9.52	7.47	9.65-9.85	7.34-7.37	7.49	7.20	8.60-8.70	12.60-12.80	12.60	15.15	15.25
Buffalo	.20	6.35-6.48	7.40[3] 7.45	8.80-8.84	6.70-6.75	.....	6.65-6.70	6.70-6.77	6.50-6.55	7.85[3] 7.90	12.50	12.30	14.85	14.90[3]
Chicago	.20	6.38	7.38	8.30	6.62	.....	6.62	6.69	6.51	7.25	12.25	12.05	14.60	14.70
Cincinnati	.20	6.49-6.53	7.37-7.42	8.25-8.30	6.86-6.91	.....	6.81-6.86	6.91	6.75-6.80	7.55	12.55	12.35	14.90	15.00
Cleveland	.20	6.38	7.38	8.25	6.72	.....	6.69	7.02	6.57	7.35	11.96	12.11	.....	14.76
Denver		8.15	9.15	10.37	8.40	.....	8.10	8.15	8.30	9.27	.....	.....	.....	16.30
Detroit	.20	6.57	7.57	8.50-8.58	6.90	.....	6.80-6.85	7.16	6.79	7.54	12.45	12.35	14.80	14.90
Houston	.20	7.35	7.00	9.93	7.70	.....	7.35	7.60	7.70	9.50	.....	13.10	.....	.....
Kansas City	.20	7.05	8.05	8.95	7.29	.....	7.19	7.36	7.18	8.07-8.27	.....	12.27	.....	.....
Los Angeles	.20	7.50	9.35	9.95	7.85	.....	7.45	7.65	7.45	10.15	.....	13.35	.....	16.50
Memphis	.10	6.79	7.09	.....	6.90	.....	7.01	7.09	6.85	8.24	.....	.....	.....	.....
Milwaukee	.20	6.47	7.47	8.21-8.30	6.71	.....	6.61	6.86	6.60	7.44	12.34	12.14	14.69	14.79
New Orleans	.15	6.70	7.65	9.23	6.80	.....	6.90-6.95	7.05	6.80	8.70-10.70	.....	.....	.....	.....
New York	.10	6.97-6.98	7.78-8.46	8.70[1] 8.99	7.36-7.56	.....	7.18-7.27	7.13-7.38	7.30-7.37	8.43-8.73[2]	12.63	12.43	.....	15.08
Norfolk	.20	7.00	.....	.....	7.10	.....	7.10	7.10	7.10	8.60	.....	.....	.....	.....
Philadelphia	.10	6.19	7.29[2]	8.09[4] 8.23	6.96	.....	6.69	6.54	6.74	8.19[3]	.....	11.66-12.21	.....	14.86
Pittsburgh	.20	6.38	7.38	8.30-8.50	6.72-6.75	.....	6.52	6.69	6.51	7.85	12.25	12.05	14.60	14.70
Portland	.20	7.00	7.75	9.05	7.25	.....	6.85	7.00	7.05	10.20	.....	.....	.....	.....
Salt Lake City	.20	7.65	10.20	10.70	9.05	.....	7.70	7.70-8.05	8.00	10.95	.....	.....	.....	.....
San Francisco	.20	7.55	8.05	9.35-9.65	7.80	.....	7.40	7.50	7.35	10.05	.....	13.35	.....	16.50
Seattle	.80	8.10	9.80	10.15	8.20	.....	7.80	7.75	7.80	10.95	.....	13.66	.....	16.45
St. Louis	.20	6.62-6.67	7.67	8.54-8.59	6.91	.....	6.81	7.09	6.80	7.64	12.54	12.34	14.84-14.89	14.99
St. Paul	.15	7.03	8.03-8.58	8.96	7.29	.....	7.19	7.35	7.18	8.01	.....	12.56	.....	15.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: ([1]) 1500 to 9999 lb. ([2]) 1000 lb or over. ([3]) $.25 delivery. ([4]) 1000 to 1999 lb, $.25 delivery.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.54
18	4	1	—	5	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29

High-carbon chromium	.73
Oil hardened manganese	.405
Special carbon	.37
Extra carbon	.31
Regular carbon	.26

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24 in., del'd N. Y.	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$129.50 to $131.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective Mar. 1, 1955, to end of 1955 season.

	Gross Ton
Openhearth lump	$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.25 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.00
Swedeland, Pa., f.o.b.	23.00
Painesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.42
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	20.50	40	100, 110	9.98
20	72	20.00	35	110	9.95
12 to 18	72	20.50	30	110	9.95
7 to 10	60	21.00	24	72 to 84	9.10
8	60	23.25	20	95	9.95
4	48	28.00	17	72	9.10
3	48	27.25	14	72	9.50
2½	30	28.00	10, 12	60	10.30
2	24	43.50	8	60	10.55

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	C.
½ in. & smaller x 4 in. & shorter	2	22
½ in. & smaller x 6 in. & shorter	+3	18
9/16 in. & ⅝ in. x 6 in. & shorter	+4	17
¾ in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
½ in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+2	19
Plow bolts	32	22

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	Discount, Case or Keg
⅝" or smaller	55	64
¾" to 1¼" inclusive	58	66
1⅜" to 1½" inclusive	60	67½

C.P. Hex regular & hvy.

All sizes	55	64

Hot Galv. Nuts (all types)

⅝" or smaller	38	50
¾" to 1½" inclusive	41	52½

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes	55	66

Rivets

	Base per 100 lb
½ in. & larger	$9.25
	Pct Off List
7/16 in. and smaller	37

Cap Screws

	Discount Bright	H.C. Heat Treated
New std. hex head, packaged ⅝" x 6" and smaller and shorter	38	28
¾", ⅞", 1" x 6" and shorter	15	1
New std. hex head, bulk* 5" x 6" and smaller and shorter	50	42
¾", ⅞", 1" x 6" and shorter	32	21

* Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
3,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Quantity	Discount Mach. Screws	Stove Bolts
Packaged, package list		33	43
Bulk, bulk list			
¼-in. diam. & under	15,000- 99,999	17	59
	100,000-199,999	25	63
	200,000 & over	33	67
5/16-in. diam. & larger	15,000- 49,999	17	59
	50,000- 99,999	25	63
	100,000 & over	33	67
All diam. over 3 in. long	5,000- 49,999	..	59
	50,000- 99,999	..	63
	100,000 & over	..	67

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Square
Packaged, package list		30	33
Bulk, bulk list			
⅜-in. diam. & smaller	15,000- 99,999	15	17
	100,000-199,999	23	25
	200,000 & over	31	33

REFRACTORIES

Fire Clay Brick	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$114.00
No. 1 Ohio	107.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	107.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	17.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$120.00
Childs, Hays, Pa.	135.00
Chicago District	130.00
Western Utah	.....
California	.....
Super Duty Hays, Pa., Athens, Tex., Windham	137.00
Curtner, Calif.	155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	20.00
Silica cement, net ton, bulk, Hays, Pa.	22.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	21.00
Silica cement, net ton, bulk, Utah and Calif.	.....

Chrome Brick	Per net ton
Standard chemically bonded, Balt.	$86.00
Standards chemically bonded, Curtner, Calif.	96.28
Burned, Balt.	80.00

Magnesite Brick	
Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite	St. ⅝-in. grains
Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	38.08
in sacks	43.75

Dead Burned Dolomite	Per net ton
F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$14.50
Midwest	15.10
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill.
Price, net ton; effective CaF_2 content

72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East	12.0¢
F.o.b. ship. pt., carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, 99.5+% Fe	38.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 100 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.8+% Fe	$1.03¢ to $1.43
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	49.50¢
Copper, reduced	49.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	23.50¢
Manganese	57.0¢
Moiybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder, 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.0¢ plus metal value
Tungsten, 99% (65 mesh)	$4.05
Zinc, 10 ton lots	17.5¢ to 25.0¢

Ferroalloy Prices

(Effective Mar. 8, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C ..	36.00	0.15% C ...	33.75
0.025% C, Simplex ..	34.50	0.20% C ...	33.50
		0.50% C ...	33.25
0.06% C ...	34.50	1.00% C ...	33.00
0.10% C ...	34.00	3.00% C ...	32.75

65-69% Cr, 4-9% C 24.75
62-66 Cr, 4-6% C, 6.9% Si 25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10 max. C	$1.18
0.50% max. C	1.16
9 to 11% C	1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ⅛ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-6; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn:

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	11.85
Ton lots packed	13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	48.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads Ton		Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $85.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $88.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.55
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.40
50% Si	13.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.65	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe.

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$12.00
Less ton lots	12.05

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta.... $6.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.46

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.60

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ½ x down, packed, per pound contained W, ton lots, f.o.b. $3.80

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.27
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.24

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk, lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump, packed	17.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, contract basis, per lb of alloy.

35-40%, f.o.b. freight allowed, ton lots	26.00¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Boroail, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 314%, Si, 40-45%, per lb contained 2.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in., x D, Ton lots... $1.20

F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 6	63¢
No. 79	50¢

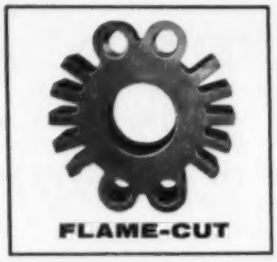
Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

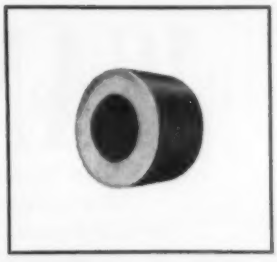
Ton lots	$1.46
Less ton lots	1.57

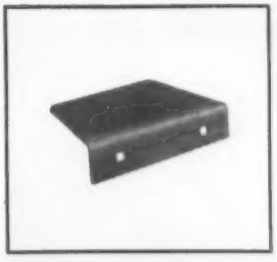
Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd, less ton lots $2.05

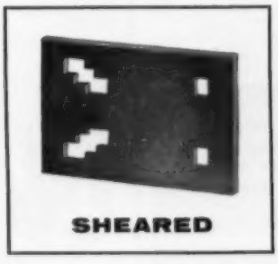
Silcaz, contract basis, delivered.

Ton lots ..... 45.00¢









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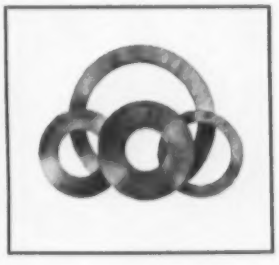

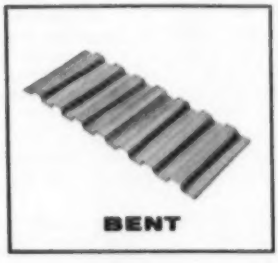

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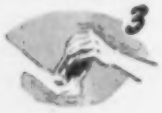

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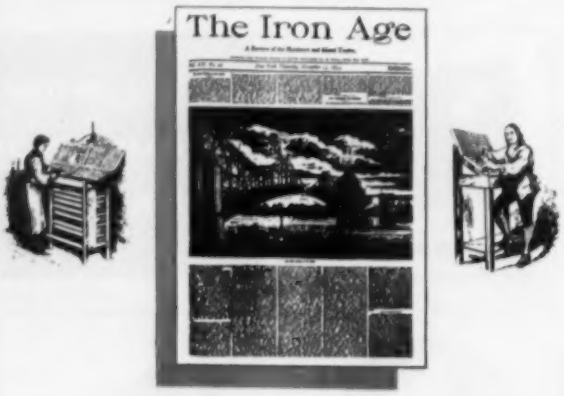

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Rules

1. Address entries to the Publisher, The Iron Age, 100 East 42nd Street, New York 17, N. Y. They must be received no later than April 1, 1955.
2. Do not send original copy. Mail a statement of proof. Photostats or photographs of the front cover will be accepted. The Iron Age cannot assume responsibility for actual old issues.
3. All entries will be judged by a committee composed of the Editor of The Iron Age and the President of The National Industrial Advertisers Association.
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5. All photostats or photographs of old issues become the property of The Iron Age. Entries cannot be returned.
6. Finders of the award winning entries will be required to give these issues to The Iron Age in exchange for their rewards.
7. Winners will be announced in the 100th Anniversary issue of The Iron Age, June, 1955. The Iron Age reserves the right, however, to publish the dates and names of contest entrants during the progress of the contest.
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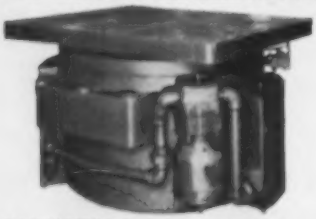

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Chicago Reports Gloom . . . Despite a strengthening of machine tool rebuilding, a continuation of an increase that began as early as 3 months ago, and despite a number of stronger selling reports from most firms, there's some gloom cropping up among smaller used machine tool sellers' reports from the Midwest.

Though part of the pessimism may be due to a fairly good late January followed by a noticeable slump in early February sales, at least a few dealers were complaining last week of continuing drops in inquiries and sales volume. This was despite gains in heavy sheet metal equipment, welding equipment, some advance in general line items like lathes, and a further advance in precision rebuilding jobs.

Say Lag Lasts . . . A scattering of smaller dealers felt that the early February fall-off was, for them at least, continuing. Even though their inquiry rate had picked up, the ratio of sales to inquiries was continuing at a rate below that reached in the opening weeks of 1955. One seller argued that his early February inquiries had fallen to about half the figure he was getting in mid-January.

The drop was unusually steep even among the pessimists, and is not representative of the general outlook, but a number of dealers who've been watching their own sales advance slowly for the past 45 days are not forgetting that in the past a dropoff in the market has often been felt first by smaller suppliers of light, general purpose equipment.

Not All Bad . . . The signs everywhere else are certainly not bad. Down-state inquiries for equipment are continuing in good strength and one small rebuilder has boosted his backlog on rebuilding jobs covering lathes, shapers, and milling machines to a 90-day figure, the best he's had in the past year.

Similarly a number of larger firms are reporting a continuing advance in their own sales volume and, in particular, a pickup in welding equipment that's not much over a week old, on the basis of both inquiries and sales. Following the old adage that you can make more money in your buying than in your selling, pressure is increasing on buying prices.

Rise Follows Slump . . . On the basis of actual sales, the first part of February, as reported by a number of suppliers, was a local slump that carried many firms below the selling levels they had achieved by late January. In the past 10 days, larger suppliers have been reporting an advancing inquiry rate and an advancing order rate. Heavy presses, not an easy item to handle, have advanced.

When total volume figures are available, they will probably indicate a higher overall volume for the industry in the Chicago area in February than in January despite the slow opening, as sales in heavier, higher cost equipment began to advance again by mid-February. Included also in the local advance were a number of medium lathes and some heavy sheet metal working equipment to Southern and Eastern accounts.

Hold Off Buying . . . Smaller firms with continuing slow sales report that many shoppers from nearby areas who purchase light equipment are making inquiries but holding down purchases. Particularly hard hit on an out-of-town sales basis has been light stamping equipment. This normally moves out of Chicago into several nearby states in fair volume and should be stronger in the light of stronger steel purchases by nearby stamping firms. Heavier equipment is moving out of town in increasing volume.

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5 ton P&H	80' Span 220/3/60 A.C.
7½ ton Shepard-Niles	22' Span 220/3/60 A.C.
10 ton Shepard-Niles	48' Span 230 Volt D.C.
10 ton Harnischfeger	50' Span 220/3/60 A.C.
15 ton OCT	45' Span 220/3/60 A.C.
15 ton Case	80' Span 230 Volt D.C.
15 ton P&H	97' Span 115 Volt D.C.
With 220/440 AC Generator Set	
25 ton P&H	60' Span 230 Volt D.C.
With 5 ton Auxiliary	
30 ton Whiting	60' Span 230 Volt D.C.
50 ton Niles	60' Span 220/3/60 A.C.
125 ton Cleveland	65' Span 220 Volt D.C.
With 2 Trolleys 62½ ton & 10 ton Aux.	

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Taylor Wilson Cut-off Machine, Capacity 2⅝" to 6⅝" Complete with Hydr. System & Elec. Equip.

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35,000 McKay Chain Draw Bench, 41' Length of Draw
100,000# Poole Draw Bench, Max. length of bar 39' With draw up to 4½" max. round

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1" 1½" Acme
8" AJAX with Air Clutch
1", 1¾", 2¼", 3", 3½", 4", 5" Ajax
1½", 4", 5" National
7¾" National—Air Clutch

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Lee Wilson Annealing Furnace — Natural Gas Work Dimensions 42" Coil, 96" Piling Height

FURNACE—HEATING
Rockwell Rotary Hearth Gas Fired Forge Furnace

FURNACES—MELTING
2 ton Whiting Hydro Arc, Top Charge
6 ton Heroult, Side Charge, with Transformer
10 ton Elec. Furnace Co. Arc Melting Furnace

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54" Aetna Standard 17 Rolls 4⅛" Dia.
72" McKay 15 Rolls 4⅛" Dia.
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MULTISLIDE MACHINE
#35 U S Multislide Max. width of stock 4¼" by .089 thick. Edgewise Stock Straightener

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Thomas Machine Mfg. Co. Plate Duplicator. Handles Plates 6' x 16'. Punch Capacity 6" Hole through ½" Plate

PRESSES—HYDRAULIC
100 ton Southwark 4-Column, 14" Stroke Platen 18" x 24"
500 ton Wood 4-Columns, 24" Stroke, 72" x 96" Between Columns
1200 ton Birdsboro 4-Columns, 20" Stroke 30" x 36" Between Columns

PRESS—STRAIGHT SIDE
#307A Bliss Double Geared, 28" Stroke, Bed Area 38" x 42"

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Chatz All Steel Universal Ironworker NEW 1940 Capacity Punch 1⅝" thru 1¼", Shear 3" Rd., 2½" Square, 6 x 6 x ⅝" Angles
#2 Long & Allstatter Double End, Punch 1" x 1"
#5 Wickes Single End 42" Throat 1½" x 1"
Style W Cleveland Single End, 60" Throat, 312 Ton With Attachment for Dishing Heads

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32" x 58" Three High Breakdown Mill
7½" Steckel Four High Rolling Mill
8" x 12" Blake & Johnson Single Stand Two High
10" x 14" United Three Stand Two High
12" x 16" Waterbury Farrel Temper Mill
12" x 16" Philadelphia 2-High Cold Rolling Mill
16" x 20" Waterbury Farrel Single Stand 2-High
16" x 20" Lewis Two High Two Stand
20" x 36" Poole Two Stand Two High

ROLLS—PLATE STRAIGHTENING
51" Bertsch, 7 Rolls 10" Diameter

SHEARS—GATE
80" x ⅜" Pels
90" x ½" Birdsboro
11' x ¼" Garrison

SHEARS—ANGLE
6x6x1" Long & Allstatter Size H
8x8x1" Long & Allstatter Size C

SHEAR—BEAM
Pels DT-36-B Beam Shear, Capacity 3" to 15" I-beams 6x6x⅝" Angles, Belted Motor Drive

SHEARS—ROTARY
3/16" Quickwork Rotary Shear, 36" Throat
¼" Kling #250, With Flanging Attachment
⅜" Quickwork Circle Shear 18" Throat, Circle Cutting Attachment

SHEARS—SQUARING
8'x 3/16" Niagara 8E, Motor Dr.
10' x 3/16" Dreis & Krump, Motor Driven
12' x ⅜" American
120" x ½" Niagara #810
156" x ⅝" Birdsboro

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72" Yoder Sheet Slitter

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5,000 lb. Olsen Hydraulic LaCap Universal
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200,000 lb. Tinius Olsen Chain Testing Machine
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9' arm 16" col. American radial, H.D.

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72" Hanchett 3-spd. rotary surface, new 1946.
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16" x 96" Landis gap type cylindrical, new 1941.

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14" x 6' Headey Toolroom, 1940.
12" x 30" Monarch Model C, new 1942.
15" x 30" Lipe Carbo-Matic, 1942.
24" x 48" Monarch Toolroom, 1942.
No. 5 Gisholt, Pro-Selector, univ., new 1942.

MILLS
1-12 & 2-18 Cincinnati production.
1-2-3-4-5-6 knee type plain & vertical.
No. 3B Brown & Sharpe, pl. horiz., 1942.
24" x 24" x 12" Ingersoll adj. rail planer type, 1943.
42" x 42" x 18' Ingersoll adj. planer type.
60" x 48" x 16' Ingersoll adj. rail planer type.
No. 2H K & T plain horiz., new 1942.

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12"x½" Dreis & Krump bending brake.
105 ton No. 7½ Verson OBI (2) 1939.
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150 ton No. 13-1 Cleveland OBI, late type.
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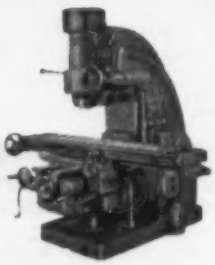

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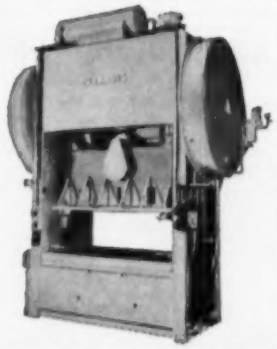

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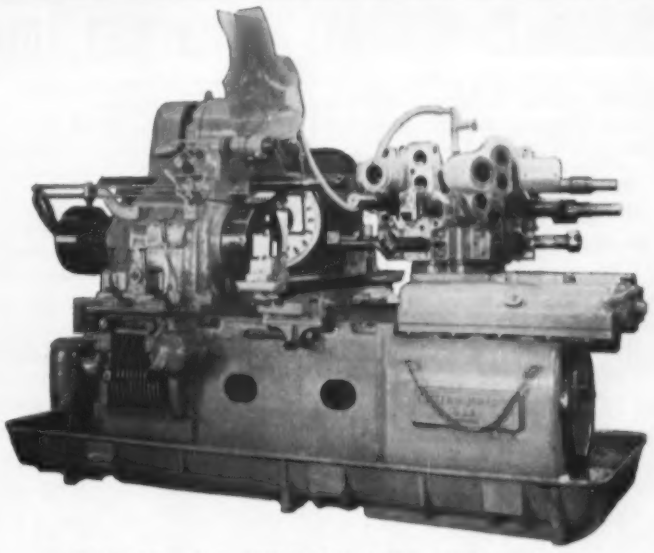

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SERIAL No. 53901

Swing over bed 30"
Swing over cross slide 17"
Travel of cross slide 5" each way
No. of faces on turret—6
Dia. of holes in turret 2¼"
Turret slide travel 13"
Feed of turret slide 8"
Slide adj. 8⅝"
Spindle speeds 20
Range spindle speeds 12 to 304 RPM
Hole thru spindle 2⅝"
Number feeds 24. Range of feeds per rev. of spindle .004" to .043"

Equipped with:
12" hyd. cylinder for chuck
Hydraulic power unit for cylinder
18" 3-jaw chuck
With tooling as shown in photograph
Motor driven coolant pump
15 H.P. motor 220-440 volt
Starting equipment

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Motor Starter — Air Receiver
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200	Westg.	4160/2200	275
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170	G.E.	440	125
150	G.E.	2300	125/250
150	Al.-Ch.	2300	275
150	Westg.	2300	125/250
150	G.E.	440	275
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100	Westg.	440	125
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2 inches	23.75	21.90	20.40	19.20	18.00	17.20
3 inches	34.55	32.85	30.60	27.00	27.00	26.00
4 inches	46.10	40.80	38.40	36.00	34.55	32.65
5 inches	57.60	51.00	45.00	45.00	43.20	40.80
6 inches	65.50	61.20	54.00	54.00	51.85	48.95
8 inches	87.35	76.80	72.00	69.15	65.30	60.85
10 inches	110.00	90.00	90.00	86.35	82.00	76.00
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2	1200	Whse.	720	600	2300
1	500	C.W.	720	275	2300/440
1	400	C.W.	1200	125/250	440
1	300	G.E.	720	275	2300
2	200	G.E.	720	250	2300/440
1	150	G.E.	720	250	2300/440
1	100	Whse.	900	275	2300
1	100	C.W.	1200	125	440/220
1	85	C.W.	1200	250	4000/2200

DIRECT CURRENT MOTORS 230-VDC

Qu.	HP	Make	Type	RPM
3*	3000	Whse.	Mill	600
1*	2000	Whse.	Mill	230/460
6*	1500	Whse.	Mill	600
4*	1200	Whse.	Mill	600
6*	800	Whse.	Mill	600
8	700	Whse.	Mill	275/700
1	350	G.E.	CD-160	1150
1	250	G.E.	MPC	325/975
1	200/250	G.E.	MPC	300/900
1	200	Whse.	Mill	300/1200
1	180	G.E.	MPC	400
1	90/166	G.E.	MPC	625/1125
1*	125	Whse.	SK-153	600
2	125	Whse.	SK-184	575/850
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6	75	C. Wh.	53H	860

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1	25	Whse.	SK-140	400/1200
1	20	G.E.	CD-122	300/1200
1	15	Whse.	SK-83	575/1725
1	15	Reliance	155-T	400/1600
5	15	Whse.	SK-106L	500/1500
4	10	Whse.	SK-91	250/1000

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TRANSFORMERS

Qu.	Kva	Make	Phase	Voltage
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3	667	Wagner	1	23,000/11,000-2300/4000
3	500	G.E.	1	23,000/11,000-2300/4000
3	333	G.E.	1	13,200-2300
3	250	G.E.	1	2400-240/480
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2	1500	Whse.	Rev	600	600
1	1400	G.E.	MCF	600	63/190
1	1200	G.E.	MCF	600	750/950
1	940	Whse.	QM	250	140/170
1	900	Whse.		250	450/550
1	825	Whse.		250	95/190
1	600	Al. Ch.		250	400/800
1	500	Whse.	CC-216	600	300/900
1	500	G.E.	MCF	250	300/900
2	450	Whse.		550	415
1	250	G.E.	MPC	230	400/600
1	200	Rel.	1070T	230	720
4	200	G.E.	CD-1650Z	230	500/1500
1	200	Whse.	CB-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
3	150	Cr. Wh.	83H-TEFC	230	890
1	150	Whse.	SK-151B	230	900/1800
1	150	Whse.	SK-201	230	360/950
1	120	G.E.	MCF	230	250/1000
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1	125	Whse.	SK-183	230	850

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2	2000	G.E.	514	600	6600/13200
2	2000	G.E.	450	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	C.W.	514	30/115	4000/13000
1	1000	G.E.	900	260	6600
3	1000	G.E.	720	600	2300/4600
2	750	G.E.	720	275	2300/4600
1	750	C.W.	514	30/115	2300
1	600	G.E.	720	250	440/2300

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1	2500	Whse.	OISC	3	26400/13200x460
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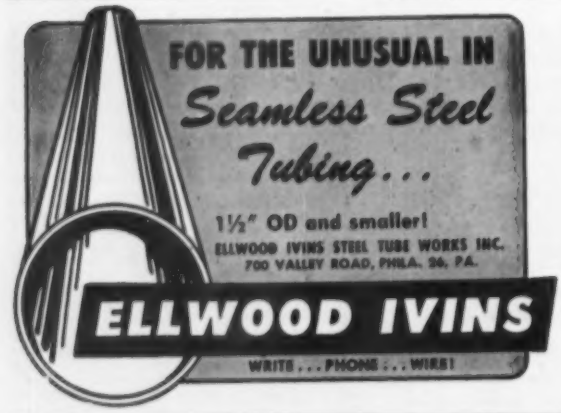
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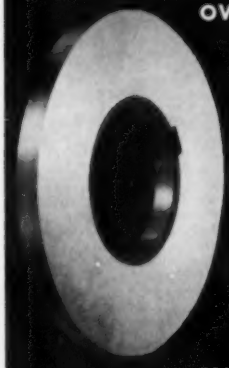

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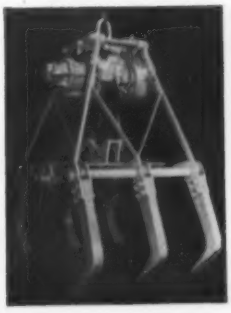

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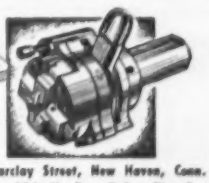

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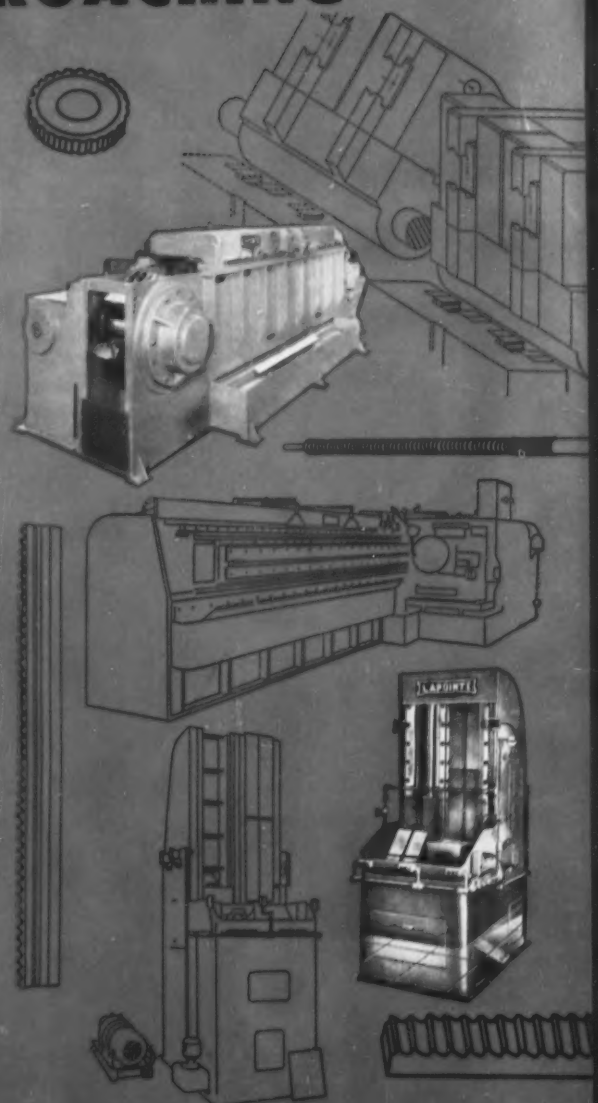

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